# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

No. 2545.—VOL. LIV. LONDON, SATURDAY, MAY 31, 1884. PRICE (WITH THE JOURNAL) SIXPENCE BY POST £1 4s. PER ANNUM.



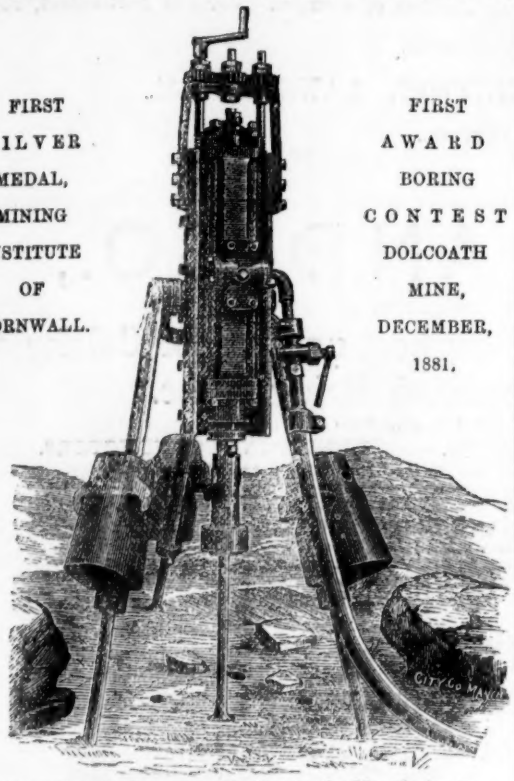
FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC —Highest Award for Effectiveness in Boring, and Economy in the Consumption of Air

JUBILEE EXHIBITION, 1882.

THE PATENT

**"CORNISH" ROCK DRILL.**

FIRST SILVER MEDAL, MINING INSTITUTE OF CORNWALL.



FIRST AWARD BORING CONTEST DOLCOATH MINE, DECEMBER, 1881.

Prices and particulars on application to the Manufacturers

HOLMAN BROTHERS,

CAMBORNE FOUNDRY AND ENGINE WORKS,

CAMBORNE, CORNWALL.

ENGINES, AIR COMPRESSORS, TUNNELLING CARRIAGES, TRIPODS, &c.,

From own design, or to order.

THE PATENT

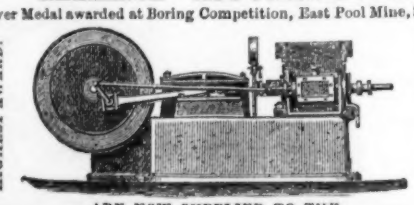
**"ECLIPSE" ROCK-DRILL**

AND

**"RELIANCE AIR-COMPRESSOR."**

First Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.

PRIZE MEDAL, HIGHEST AWARD.



PARIS EXHIBITION. 1878.

ARE NOW SUPPLIED TO THE

ENGLISH, FOREIGN, AND COLONIAL GOVERNMENTS

And are also in use in a number of the

LARGEST MINES, RAILWAYS, QUARRIES, AND HARBOUR WORKS IN GREAT BRITAIN AND ABROAD

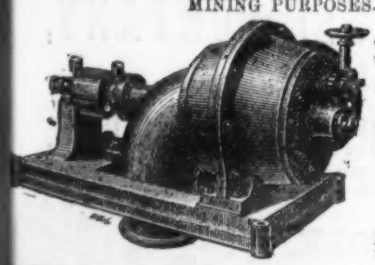
FOR ILLUSTRATED CATALOGUE AND PRICES, apply to—

HATHORN & CO., 22, Charing Cross, London, S.W.

**WATER POWER,**

UTILISED WITH THE GREATEST ECONOMY AND EFFECT BY THE PATENT "TRENT" TURBINE.

As arranged, with a horizontal spindle, it is specially adapted for MINING PURPOSES.



Catalogues on application to the sole British Maker,

C. L. HETT,

ANCHOLME FOUNDRY,

BRIGG, ENGLAND.

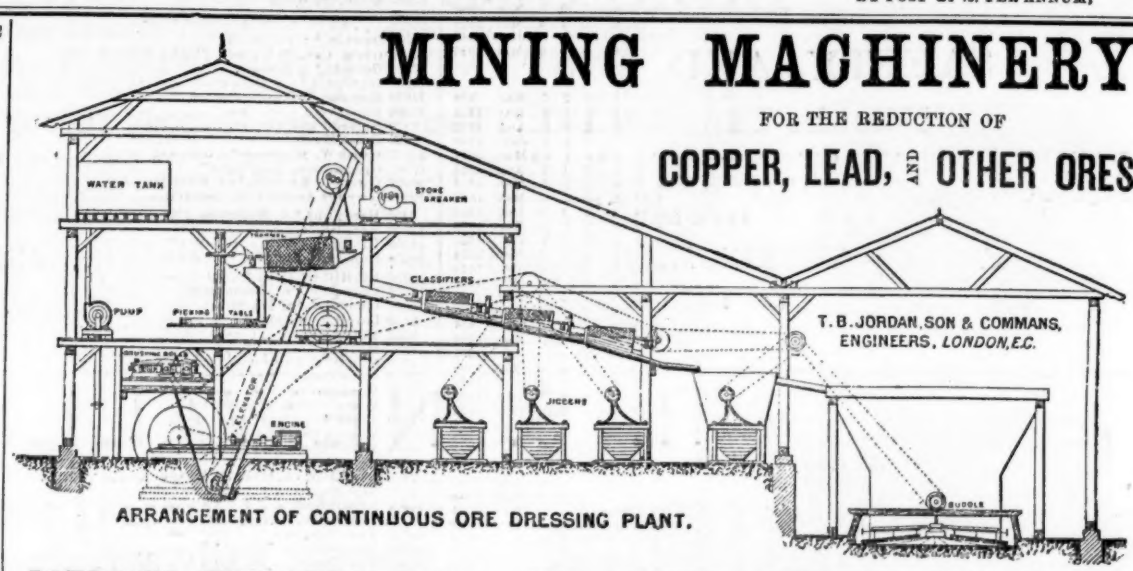
The Patent Trent, New American Hercules, & Victor Turbines.

MONEY LENT, at EIGHT, NINE, and TEN PER CENT., on FIRST MORTGAGE of FREEHOLDS for IMPROVEMENTS and BUILDING, said freeholds in the Province of MANITOBA. Address, HERBERT C. JONES, Solicitor, 26, Masonic Hall, Toronto

**MINING MACHINERY**

FOR THE REDUCTION OF

**COPPER, LEAD, AND OTHER ORES**




ARRANGEMENT OF CONTINUOUS ORE DRESSING PLANT.

JORDAN'S IMPROVED GOLD AND SILVER REDUCING MACHINERY, PATENT PULVERIZERS, AND ROCK DRILLING PLANT, &c., &c.

**T. B. JORDAN, SON, and COMMANS, 52, Gracechurch St., London, E.C.**

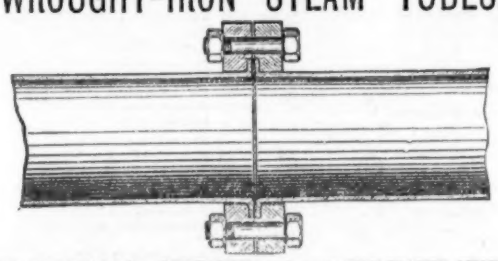
IMPROVED **INGERSOLL** PATENT

**ROCK DRILL**

MEDALS AND HIGHEST AWARDS.

American Institute, 1872.
American Institute, 1873.
London International Exhibition, 1874.
Manchester Scientific Society, 1875.
Leeds Exhibition, 1875.
Royal Cornwall Polytechnic, 1875.
Rio de Janeiro Exhibition, 1875.
Australia Brisbane Exhibition, 1876.
Philadelphia Exhibition, 1876.
Royal Cornwall Polytechnic, 1877.
Mining Institute of Cornwall, 1877.
Paris Exhibition, 1878.

**WROUGHT-IRON STEAM TUBES.**



TUBES FOR BOILERS, PERKINS'S, and other HOT-WATER SYSTEMS.

For Catalogues of Rock Drills, Air Compressors, Steel or Iron Steam Tubes, Boiler Tubes, Perkins's Tubes, Pneumatic Tubes, Boring Tubes, and all kinds of Machinery and Mining Plant, apply to—

**LE GROS, MAYNE, LEAVER, & CO.**

60, Queen Victoria Street, London, E.C.

W. F. STANLEY

MATHEMATICAL INSTRUMENT MANUFACTURER TO H.M.' GOVERNMENT, COUNCIL OF INDIA, SCIENCE AND ART DEPARTMENT, ADMIRALTY, &c.

MATHEMATICAL, DRAWING and SURVEYING INSTRUMENTS of every description, of the highest quality and finish, at the most moderate prices.

Price List post free.

ENGINE DIVIDER TO THE TRADE.

ADDRESS—GREAT TURNSTILE, HOLBORN, LONDON, W.C.

MR. P. S. HAMILTON (late Chief Commissioner of Mines for the Province of Nova Scotia), PRACTICAL GEOLOGIST, MINING AGENT, and MINING ENGINEER, HALIFAX, NOVA SCOTIA.

PURCHASES and SALES of MINING PROPERTY effected, with careful regard to the interests of clients.

THE

**"Barrow" Rock Drill**

COMPANY.

HOSKING AND BLACKWELL'S PATENT.

SUPPLY their CELEBRATED ROCK DRILLS, AIR COMPRESSORS, &c., and all NECESSARY APPLIANCES for working the said Drills.

The DRILLS are exceedingly STRONG, LIGHT, SIMPLE, and adapted for ends stopes, quarries, and the sinking of shafts. They can be worked by any miner

Their DRILLS have most satisfactorily stood the TEST of LONG and CONTINUOUS WORK in the HARDEST KNOWN ROCK in numerous mines in Great Britain and other countries clearly proving their DURABILITY and POWER.

About 200 are now at work driving from three to six times the speed of hand labour, and at from 20 to 30 per cent. less cost per fathom. They can be worked by any miner.

For PRICES, Particulars and Reports of Successful and Economical Working, apply to—

LOAM AND SON,

LISKEARD, CORNWALL.

THE PATENT

**"Cranston" Rock Drill,**

AIR COMPRESSOR AND DEEP BORING MACHINERY.

For prices, and particulars of rapid and economical work accomplished, apply t

J. G. CRANSTON,

22, GREY STREET NEWCASTLE ON-TYNE.

FIRST AWARD.
SYDNEY. 1879.

FIRST AWARD.
MELBOURNE, 1881.

BICKFORD'S PATENT FUSES

SILVER MEDAL OF THE MINING INSTITUTE OF CORNWALL, TRURO, 1880,
for an Improved Method of Simultaneous Blasting.

FOR SIMULTANEOUS BLASTING.

# BICKFORD, SMITH AND CO.,

THE INVENTORS, AND ORIGINAL PATENTEES AND MANUFACTURERS OF

## SAFETY AND INSTANTANEOUS FUSES AND IGNITERS

FOR USE IN ALL BLASTING OPERATIONS AND SPECIALLY PREPARED FOR ANY CLIMATE

**Note the TRADE MARK: Two Separate threads through centre of Fuse.**

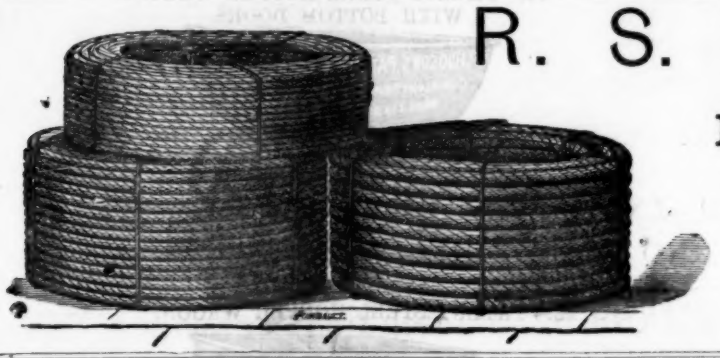
BICKFORD, SMITH AND CO.'S Patent Igniters and Instantaneous Fuses for simultaneous blasting are being extensively used at home and abroad. This improved method is the cheapest, simplest, and most dependable ever introduced for simultaneously firing any number of charges. For full particulars, see Descriptive Catalogue.

PRICE LISTS, DESCRIPTIVE CATALOGUES, AND SAMPLES TO BE HAD ON APPLICATION.

FACTORIES—TUCKINGMILL CORNWALL; AND ST. HELENS JUNCTION, LANCASHIRE.

HEAD OFFICE—TUCKINGMILL, CORNWALL.
LANCASHIRE OFFICE—ADELPHI BANK CHAMBERS, SOUTH JOHN STREET, LIVERPOOL.
LONDON OFFICE—85, GRACECHURCH STREET, E.C.

Every package bears Bickford, Smith, and Co.'s copyright label.



# R. S. NEWALL AND CO.,

Sole Patentees of Untwisted Wire Rope.

**Iron & Steel Ropes of the highest quality for Collieries, Railways, Suspension Bridges, &c.**

PATENT STEEL FLEXIBLE ROPES AND HAWSERS.
IRON STEEL, AND COPPER CORDS. LIGHTNING CONDUCTORS.
COPPER CABLES of high Conductivity for Electric Light and Power.

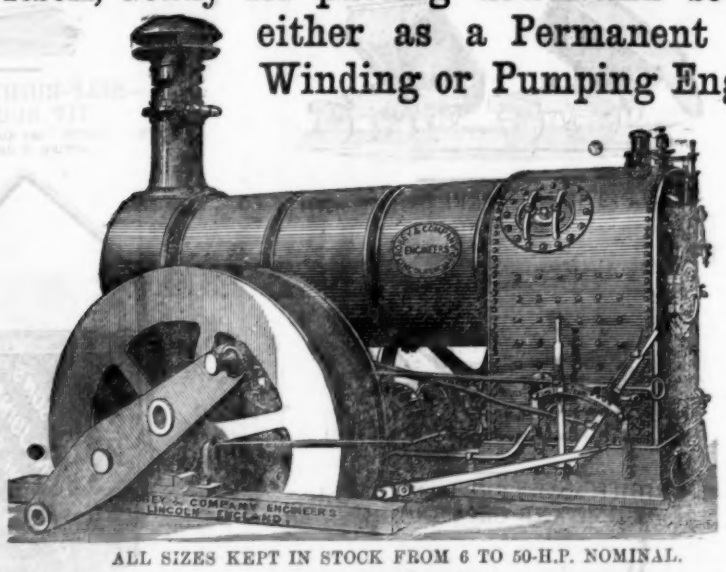
London: 130, STRAND, W.C. Liverpool: 7, NEW QUAY.
Glasgow: 68, ANDERSTON QUAY.
MANUFACTORY: GATESHEAD-ON-TYNE.

NOTICE TO COLLIERY PROPRIETORS, MINE OWNERS, &c.

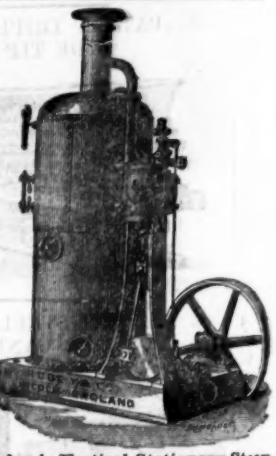
Robey's Superior Portable Engines, 4 to 50-h.p.

LONDON OFFICES:—
**117, Cannon Street, E.C.**

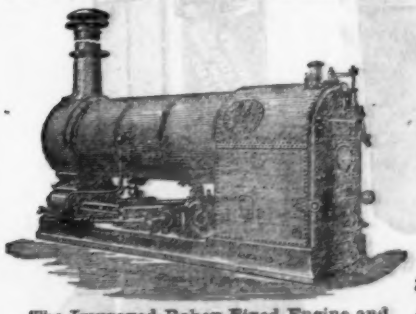
**The PATENT "ROBEY" MINING ENGINE is complete in itself, ready for putting down and setting to work, either as a Permanent or Temporary Winding or Pumping Engine.**



ALL SIZES KEPT IN STOCK FROM 6 TO 50-H.P. NOMINAL.



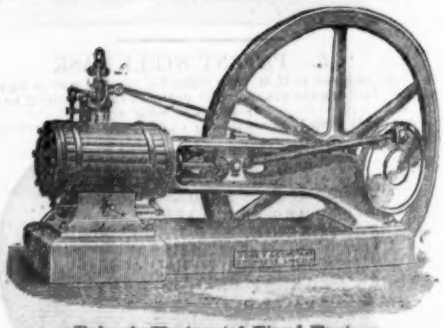
Robey's Vertical Stationary Steam Engine, 1½ to 16-h.p.



The Improved Robey Fixed Engine and Locomotive Boiler Combined, 4 to 65-h.p.

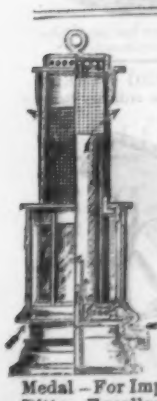
Please note this is the Original "ROBEY" Engine as designed and manufactured by Messrs. ROBEY and Co., of Lincoln. All others are mere attempts at imitation.

For particulars and prices apply to the Patentees and Sole Manufacturers—



Robey's Horizontal Fixed Engines, 4 to 60-h.p.

# ROBEY & CO., ENGINEERS, LINCOLN.



ESTABLISHED 1820.

JOSH. COOKE AND CO,

**SAFETY LAMP** AND **GAUZE MANUFACTORY,**

J.C B TRADE MARK

Honourable Mention, Paris Exhibition, 1878
Illustrated Price Lists free, by post or otherwise.

**MIDLAND DAVY LAMP WORKS,**
Belmont Passage, 203, Lawley-street,
BIRMINGHAM.

Makers of Williamson's Double Safety Lamp,
Williamson's Patent Double Safety Lamp shown half in section.

Medal—For Improved Invention—London, Kensington, 1874.
Ditto—Excellence of Workmanship—Wrexham, 1867.

# BRITISH AND FOREIGN SAFETY FUSE COMPANY,

WORKS: REDRUTH, CORNWALL,
MANUFACTURERS OF

**PATENT SAFETY FUSE FOR ALL KINDS OF BLASTING PURPOSES,**
**For MINING & RAILWAY OPERATIONS,**
ALSO FOR
**ALL KINDS OF SUBMARINE WORK.**

This FUSE is made for ALL CLIMATES, and of any length and sufficient water-resisting properties to ensure ignition at any depth.

*For PRICE LISTS, SAMPLES, &c., apply at the Works, or*

LONDON OFFICES—3 and 4, Adelaide Place, King William Street, London Bridge, E.C.
TRADE MARK,—TRICOLOUR COTTON (Red, White, and Blue), running through the column of Powder.

# R. HUDSON'S

# Patent Steel Trucks, Points and Crossings,

## PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

Telephone No. 14.
*In connection with the Leeds Exchange, and all the principal Hotels and places of business in the town.*

## GILDERSOME FOUNDRY, NEAR LEEDS.

(Near Gildersome Station, G.N.R. Main Line, Bradford to Wakefield and London, via Laisterdyke and Ardsley Junctions.)

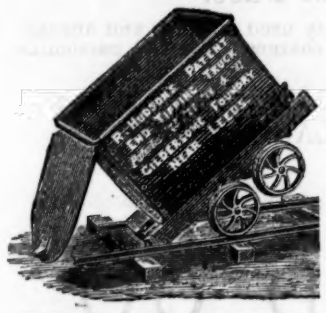
Registered Telegraphic Address:—"GILDERSOME, LEEDS." A. B. C. Code used.

UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the LIGHTEST, STRONGEST, and most CAPACIOUS made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

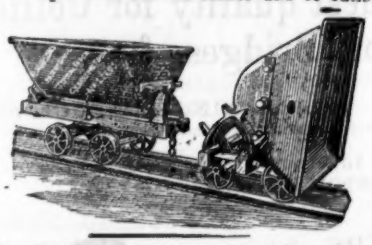
**Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.**
**N.B.—The American, Australian, Indian, and Spanish Patents on Sale.**

## CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

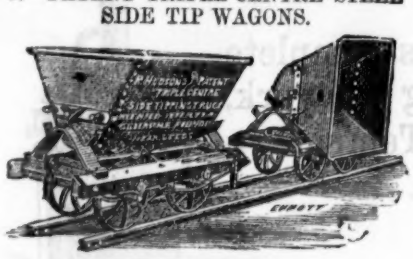
1.—PATENT STEEL END TIP WAGONS.



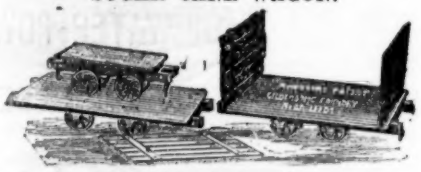

2. PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



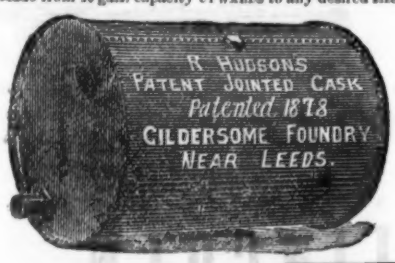
3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.



4. -PATENT STEEL PLATFORM OR SUGAR CANE WAGON.



5.—PATENT STEEL CASK.
As supplied to H.M. War Office for the late war in Egypt).
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)

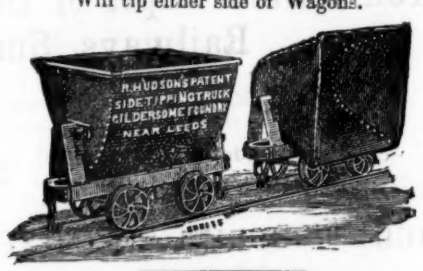



6.—ROBERT HUDSON'S
PATENT IMPROVED IRON SMITH'S HEARTH.
NO BRICKWORK REQUIRED.
A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.

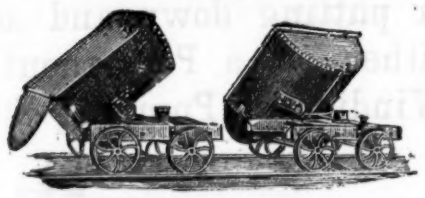
Large numbers in use by all the principal Engineers in this country and abroad.

7.—PATENT STEEL MINING WAGONS.

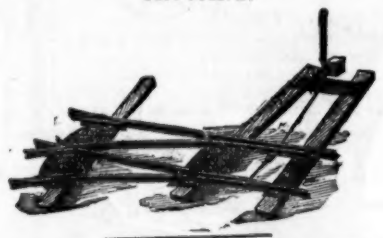
8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.



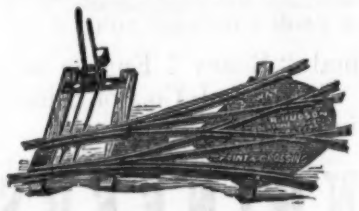

9.—PATENT STEEL ALL-ROUND TIP WAGON.



10.—LEFT-HAND STEEL POINT AND CROSSING.



11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.

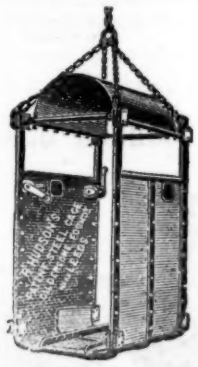


12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.

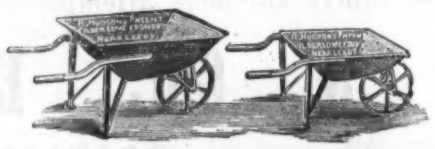
13.—PATENT STEEL HOPPER WAGON.

14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF-ACTING if desired.)

15.—STEEL CAGE.

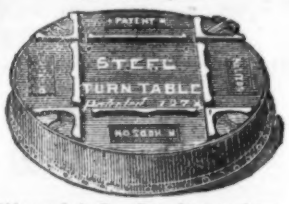


16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
Lightest and Strongest in the Market.



A great success.

17.—STEEL SELF-CONTAINED TURNTABLE.




(Also made in CAST IRON for use where weight is not a consideration.

No. 19.—PATENT STEEL CHARGING BARROW,
DOUBLE the STRENGTH & much LIGHTER than ordinary Barrow

18.—"AERIAL" STEEL WINDING TUB.

Largely employed in the South African Diamond Fields.

ONE man can EASILY tip ANY WEIGHT in these wagons.

## ALL KINDS OF BOLTS NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES

# BELL'S ASBESTOS.

**BELL'S PATENT ASBESTOS BLOCK PACKING**, for High Pressure Engines. This Packing has been specially designed to overcome the difficulties experienced by engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages for the purpose of re-packing the stuffing boxes. It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. This Packing has met with the most unqualified approval wherever it has been used, and on being taken out after about twelve months, working at 70 lb. pressure, it has been found to be in a perfect state of preservation, and was therefore replaced. The Patent Block Packing is square, as Fig. 1, and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlaid. An Engineer writes as follows:—"The Asbestos Block Packing works splendidly. I have never seen its equal. We keep our gland nuts so that you can move them with finger and thumb, and can maintain a constant vacuum of 28½ in." As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

**BELL'S ASBESTOS BOILER PRESERVATIVE.** This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that 1/16 in. thick of incrustation causes a waste of 15 per cent. of coal; ¼ in., 60 per cent.; ½ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

**BELL'S ASBESTOS YARN and SOAPSTONE PACKING**

for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—

Festiniog Railway, Locomotive Superintendent's Office,
Portmadoc, January 13, 1883.

Mr. John Bell, 118, Southwark-street, S.E.

DEAR SIR,

I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably.

Yours truly,
(Signed) W. WILLIAMS.

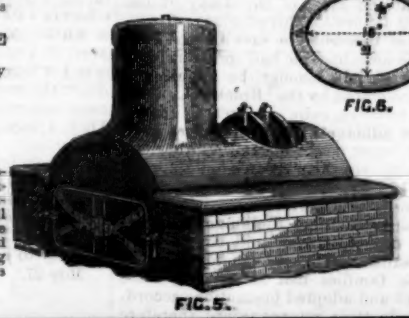
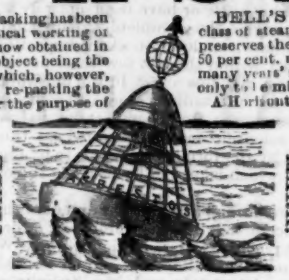


FIG. 5.



TRADE MARK.

The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All orders must be sent direct to the undermentioned depôts and not through Agents or Factors.

**BELL'S ASBESTOS BOILER AND PIPE COVERING COMPOSITION**, for coating every class of steam pipes and boilers, non-combustible and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 20 per cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.
" " Covering - - 94 deg.

One ton of coal was saved per week, and although the fire was raked out every evening, 20 lbs. of steam were found in the boiler next morning.

The following Testimonial refers to this Covering:—

Offices of the Wimbledon Local Board, Wimbledon,
Nov. 28th, 1883.

DEAR SIR,—It may interest you to know that we save exactly 40 per cent. in fuel through using your covering.—Yours truly, W. SANTO CRIMP, C.E., F.G.S.

**BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING**, for making every class of Steam and Water Joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ½ in. (Fig. 6) to 3 in. wide, and any thickness from 1/16 in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The same material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark, without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

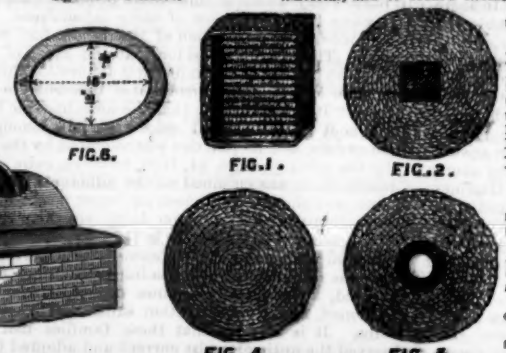


FIG. 6. FIG. 1. FIG. 2.

FIG. 4. FIG. 3.

**BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD**, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ½ millimetre to 25 millimetres thick. Each sheet bears the Trade Mark.

**BELL'S ASBESTOS EXPANSION SHEETING (PATENT).**

This Sheeting is another combination of Asbestos with India-rubber, giving to the steam user the special advantages of both materials.

The India-rubber Washer is protected from the action of heat and grease by an outer coating of vulcanised Asbestos Cloth, thus producing an excellent joint where expansion and contraction render other materials unserviceable.

This material is admirably suited to steam pipe joints and every class of valve.

Valves made of this material are very durable, as they are not subject to injury by oil.

# BELL'S "ASBESTOS LUBRICANT."

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

## BELL'S ASBESTOS WORKS, SOUTHWARK, LONDON, S. E.

OR THE DEPOTS—**118a, SOUTHWARK STREET, S.E.,**

Victoria Buildings, Deansgate, MANCHESTER. 11 and 13, St. Vincent Place, GLASGOW. 39, Mount Stuart Square, CARDIFF. 21, Ritter Strasse, BERLIN.

## BRAUN AND BLOEM'S

CELEBRATED

# DETONATORS—"EAGLE" BRAND.

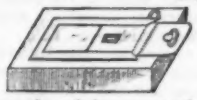
TRADE

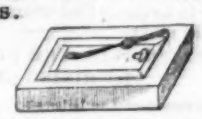
MARK.

**The most powerful Percussion Caps for exploding Dynamite, developing its fullest strength.**

PACKED IN THEIR PATENT TIN BOXES.

PATENT No. 3665.





A new invention, doing away with the very dangerous operation generally in use of inserting cutting tools when it is necessary to open the outer tin box.

**Sold by WM. BRODERSEN, 79, Leadenhall-street, London, E.C.**

SOLE AGENT FOR THE UNITED KINGDOM AND THE COLONIES

ALSO AWARDED GOLD MEDAL AT CALCUTTA EXHIBITION.

# BAXTER'S PATENT KNAPPING STONE BREAKER.

1881.

FACTS SPEAK FOR THEMSELVES.

To Mr. Baxter, Leeds. *Cinderford, Feb.* 13, 1883.

DEAR SIR,—I am pleased to be able to tell you that the Machine works splendidly. We are breaking 16 trucks a day now, and we thought it a good day's work to do 10 a day with the old Machine, so you can see the difference. I had a gentleman looking at it yesterday, and he was surprised to see it work so easily. Yours truly, E. ORGAN.

The above refers to one of our 16 by 9 Machines we supplied to replace an "Improved Blake" 15 by 9 Machine. Several of which have already been replaced by Baxter's.

PATENTEES AND SOLE MAKERS,

## W. H. BAXTER & CO., ALBION STREET, LEEDS.

## PERFORATED SHEET METALS

FOR

TIN, LEAD AND COPPER MINES,

MILLERS, BREWERS, AND MALSTERS,
COLLIERIES AND QUARRIES,
COFFEE ROASTERS AND SUGAR REFINERS.

**ALDRED & CO.,**

WORKS: PARKER STREET, ASHLEY LANE, MANCHESTER

## INCREASED VALUE OF WATER-POWER.

## MacADAM'S VARIABLE TURBINE.

This Wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and will work with equal efficiency through all variations of quantity down to a fifth or even less if required. It is easily coupled to a steam-engine, and in this way always assists it by whatever amount of power the water is capable of giving, and therefore saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the Wheel is not affected by floods or back-water.

These Turbines are at work in nearly every county in England. Apply to—

**MacADAM BROTHERS AND CO., BELFAST.**

## ROCK DRILLS

FO

## HAND AND POWER.

## DUNCAN BROS.,

32, QUEEN VICTORIA STREET,

LONDON, E.C.

## Original Correspondence.

### AUSTRIAN GOLD AND SILVER MINES—No. IV.

SIR,—It must not be supposed that the inhabitants willingly abandoned their mines and property without protest. Many of their dwellings were magnificent mansions, the remains of which still exist at Steinfeld, Ober-Vellach, and Grosskercheim. They tried every method either to make the emigration order inoperative, or at least to delay it as long as possible, which was so far effectual (by the aid of bribes and good friends at Court) that the final departure of the Evangelists only took place at Candlemas, 1604. This we gather from the two following letters of Hans Putz, who was residing at Gratz, and from letters of Melchior Putz, dated from Castle Pregrad. Letter from Hans Putz to his brothor Melchior, dated Gratz, Dec. 16, 1603:—"In accordance with my letter previously written to you, I have myself attended to the affairs of the firm, and though you have doubtless received that letter, no answer has yet come to me. Since then the works have been allowed to go on till Candlemas. I have not seen the original permission, or do I know whether it only relates to the Steinfelders; but in order that they may be clear about this, I beg of you to inform them, with many compliments, that as I do not intend very soon to remove from here, I will exert myself to get a prolongation of the term, and that I have every hope of success." I have, however, given to the Chancellor a *douceur*, and in order that I may not lose by the transaction they must contribute something to be presented to the master, when it is more probable that the longer term will be granted. For myself, personally, I only desire that the Chancellor may be retained, which can be effected for 50 fls., and request that you will take the matter in hand.

Second letter. I have your letter of Dec. 12, and in haste inform you that the messenger from Steinfeld, who I informed you had been sent to His Highness with a petition from the three Judges of Mines at Steinfeld, Vellach, and Grosskercheim, has received an answer, and has gone on to Steinfeld. I learn from a trustworthy source that the purport of the answer is as follows:—"That His Highness allows the petitioners to remain in the country till next Candlemas, and that after the expiration of that time they must either embrace the Roman Catholic religion or quit the country, and pay without fail the tenth penny. I know not what else to do, and wait to hear from you."

Letter from Melchior Putz to Geo. Ortner, dated Pregrad Jan. 2, 1604:—"Honoured and beloved friend Ortner: My services to you, together with wishes for a happy new year, and may Heaven grant you and all yours an alleviation of all your great and heavy responsibilites. Amen. I did not wish to disturb you during the holiday; but having during the last few days received news that a definite answer to our petitions is expected daily. Parliament meets on Jan. 26, and as the welfare of the miners affects not only those connected with mining, but the freedom and welfare of the entire population, and this being certain that the suspension of the mining means ruin to the country generally, it is suggested to me by Melchior Schackner that all concerned should draw up a statement of their grievances, and beg His Highness to be more merciful. The people of Steinfeld have already done this; but had this been done by the entire population there is no doubt the result would have been more favourable. I was not successful with the bribe of 50 guldens. Whether we should petition at Court for a longer term depends on you all. Heaven grant we may succeed. I doubt not a longer grant will be made; but this does not mend matters, and I much fear that the Commissioners who are now in Venice will never be more merciful."

The Parliament which assembled on Jan. 26, 1604, decided the fate not only of the Evangelists, but that of the whole country. The time of departure was fixed without respite, and the Evangelists, among whom were almost all the miners, had either to leave the country voluntarily, or were violently expelled. There being no miners, mines went to ruin; it was found impossible to import labour from elsewhere; the wealth of the district was dispersed, business vanished, and the provinces became depopulated. From this time, therefore, mining—the reduction and smelting of gold and silver—came to an end, and in the year 1617 only 1 oz. of gold and 5 ozs. of silver were produced, and when this amount is compared with the immense yield of former years, an idea of the ruin and desolation caused by religious bigotry may be formed. It is true that the production began to diminish as early as the year 1588; but this is accounted for in this way—that the mine owners, adventurers, and miners having heard that they would be ultimately expelled the country, took care to provide for this forced immigration by sending the product of their labour to friends residing outside the country.

The diminished yield of gold and silver excited the suspicions of the States Mint, and the Control officers examined Kasper Siltzingen master of the Klagenfurt Mint, on the subject, who wrote as follows to the Head Surveyor of Mines:—"Respected Burgomaster: My services to you at all times. Whereas it has been found by my masters' comparison and researches that but little gold and silver has been delivered at your mint by mine adventurers and others during last year (which seems extraordinary to my said masters), please ascertain whence this arises, and what are the causes of the same. For whereas my gracious masters wish to have an accurate knowledge of the circumstances, I could not neglect to write with due respect and regard for a written account from you of the extent and nature of the mines. I salute you sincerely, and commend you all to the protection of the Almighty."

It is much to be deplored that the answer of the Head Surveyor is not extant, as it would have cleared up the matter entirely. The flow of money into the Official Surveyor's coffers diminished, and caused very soon a deficiency which had to be made up in other ways.

An order was issued from the Inner Austrian Court Chamber on Nov. 17, 1603, to the Head Surveyor of Mines, Hans Huebmayer, that whereas the produce of the mines did not suffice for the payment of the officers, but that for some years nearly 2000 fls. had to be provided by the municipality, he must take it into consideration whether it would not be better to close altogether some of the mine courts; and in the year 1615 the succeeding Head Surveyor, Augustin Schattbächer, made a proposal for the diminution of the officials because of the insufficiency of the revenue, and it appears that the Steinfeld officials from 1590 to 1600 were constantly begging for payment of the arrears of their salary, which either could not be paid from want of money, or was held back out of religious spite and hatred; and although it would have been only justice to pay off those first who were deprived of their offices for religion's sake, and who were compelled to seek means of existence in foreign lands, but who could not emigrate without money. This course does not appear to have been adopted, as it is on record that Bonificius Scharlinger, Clerk of Mines in Grosskercheim, who had been dismissed from his office on account of his religion, incessantly solicited the Inner Austrian Court Chamber for the immediate payment of his arrears of salary from 1598 to 1604 (the period of his dismissal) in order that he, as he says, "may be able to follow his wife and children who have already quitted the country and are suffering great hardships." This matter was delayed by enquiries and so forth until 1607; but as the remaining documents are missing it is impossible to say whether he ultimately got the money or not. That, then, was the sad end of the Carinthian gold and silver mines, which there cannot be a doubt might have been in a flourishing condition at the present day had not religious bigotry and oppression driven the inhabitants from the country. Three important mining towns—Steinfeld, Ober-Vellach, and Dollach in Grosskercheim, which owed their existence to mining alone, and whose substantial buildings testify to the former wealth and prosperity of their possessors—are almost entirely without inhabitants, mines have been ruined for want of capital, and labour industry has been stopped, and agriculture discouraged; and all this is the sad consequence of fanaticism and intolerance which has inflicted on Carinthia a wound which still bleeds.

It would certainly be unfair not to mention that some historians attribute the decay of the gold and silver mines of Austria to other causes than that of religious dissentions; some say that the works ceased to be remunerative before the end of the 16th century; there is no doubt also that the thirty years' war did have an immense effect on mining, and must have materially interfered with the prosperity of the country. That the mines ceased to be productive is inferred from the diminished yield before the entire collapse: but I think little importance can be attached to this, yet if this has contributed to the downfall of mining prosperity, and although among the immense number of mineworks and mines at this time, some few may have produced but little or have been entirely worked out, yet it is impossible to imagine the complete exhaustion of all mines in the territory at one date; exploration and prospecting done by men of undoubted ablility within the last few years prove that lodes and deposits of surprising richness exist in the old workings, and that the refuse heaps and old tailings contain sufficient gold to pay enormously well those who would undertake to work them in a business-like and scientific manner; added to this the poor ore apparently rejected by the former workers is to be found in immense quantities, much of which is proved in assaying to be worth ½ oz. of gold to the ton.

The mine works are in comparison to the extent of the metalliferous deposits so insignificent that only a trifling part of ores contained in the mountains ever reached the reduction works. What are 200 or 300 stream works in a river valley that can be worked for miles and miles? For instance let us take only the Zirknitz works, although millions in gold and silver were obtained there they appear to our eyes as mere trenches, the miners seemed merely to have scratched the veins, and it is altogether absurd to imagine them to be exhausted. In the second place no doubt the miners had a presentiment of coming events, and regulated their mine works accordingly. In haste every means of immediate profit was adopted, and prospective gains formed no part of their calculations. Would this have been done if the possession of the mines had been secure in the future? Therefore I consider that the cause of the decay of the Carinthian gold and silver mines was unquestionably religious persecution. even Mühlbacher corroborates this when he says among other things: "It is well known that the new doctrine had spread rapidly throughout Carinthia, and more especially among the miners and mine owners, and its practice was tolerated by the 'Brucker Libell.'"

By the edict of Sept. 14, 1600, however, exile or a return to the Catholic faith was enjoined on the adherents of the Augsberg Confession, and though the richest and most powerful families did their best to obtain at least a longer delay, yet the pressure would appear to have been so severe that in the 17th century the powerful and influential families of Rust, Weitmoser, Filaferro, Grotta, Putz of St. Veitz, the Barons, Fugger, Radning, Rudning, Leininger, &c., disappeared, and the entire mines of gold, silver, and copper were abandoned, and the production sank from 2000 cwts. to less than 28 lbs. It is obvious that these families had at an early date observed the anti-reformist current and adopted precautions accordingly. stopped prospecting and made their returns secure, therefore the Redemption Office at Klagenfurt had already, years before the emigration commenced, ceased to receive supplies of the noble metals without any perceptable reason. From the districts over which the influence of Stobæus, Bishop of Lavant, extended, the exodus was complete, the miners going mostly to Upper Hungary, and the rise of the mining towns there dates from that period. Up to the middle of the 17th century mining was entirely suspended, and has not been able even at the present day to become again what it once was, though some attemps at its revival have been made from time to time. In the 17th century some few mines were kept going by the firm of Emmanuel Steinberger in Upper Möllthal (a memorial of Steinberger is found in Dollach, consisting of a chamber splendidly wainscotted with Siberian pine in the so-called grill-house, with the name and date over the room door), other mine owners also kept a few miners at work, and in 1683 the firm of Jäuner arose and commenced in earnest to crush and wash for gold, these firms stood for many years and obtained moderately good returns. (In some documents it states that these firms underwent a loss of 60,000 fls. in consequence of unfortunate smelting operations), but unfortunately their mining was not of a scientific character, merely gone into for present gain, so that the veins opened on were hewn out and exhausted, and the adits choked with debris they were unable to get rid of.

In 1765 the Treasury took possession of the Gold Guild, Wash-Vein, and some works in Drauthal, but only a very small amount of capital was employed, bad management prevailed, together with ill-directed mining, the officials disliked this inhospitable district, and sought to get out of it by every possible excuse; under these circumstances it is not surprising that in the year 1794 all working was entirely suspended. In this century we meet with a few parsimonious attempts at reworking the district; but from bad management and want of capital which prevented the working, except only on the most limited scale no satisfactory result is recorded.

In 1869 researches were undertaken with energy, and it has been proved without doubt that the mountains of Carinthia, Austria, contain unlimited wealth, requiring only capital judiciously expended and the mining to be carried out scientifically to enable adventurers to make immense profits. ——— F. KENSINGTON.

### PERSONAL PROFITS—THE PRIMARY INCENTIVE TO MINING—No. II.

SIR,—In pursuance of the illustrations with which I closed my last letter I proceed to state that a tree is known of what kind it is long before it bears any fruit, and long before it puts forth any blossoms indicative of what kind of fruit-bearing capacity will be realised, notwithstanding evidences and satisfactory assurances are afforded and entertained that in due time it will do so. The probabilities in the case being strong amount to a moral certainty, which is the climax attainable prospectively; the ultimate is a conditioned result, which may or not be in accordance with reasonable expectations. As much may be said of mines at their earlier stages—nay more—the blossoms indicative of the fruit of mines are to be seen from the commencement of all properly-selected enterprises, and may be regarded as trustworthy evidences of their prosperity. The blossoms of metalliferous minerals which frequently appear, and in numerous forms and features pre-exist, each bearing evidence more or less strong, clear, and convincing of future productiveness, combined with geological conditions, such as the contour of the surface, the character of the containing adjacent and proximate overlying rocks. The number, size, and structure of the ore-bearing channels, their component parts, not only as it respects their merely mineral constitutents, but the mineralised and acidefrous metallic ores, which constitute the blossoms referred to—sulphides, oxides, chlorides, carbonates, &c.—by which they are characterised, and which not unfrequently occur in occular and tangible form at the earliest superficial stages, and sometimes in well-developed exuberance, testifying more or less clearly to the existence of otherwise hidden wealth—its proximity and probable abundance, according as the several conditions harmonise, which are the harbingers and heralds of future results and consequences. It would be futile to object that reason and logic have no potency or place in mining, as that would imply an utter disregard of arrangement, if not a proscription of law, as affecting the origin, transmission, and deposition of metalliferous minerals. It is because ratiocination is disregarded that so many pecuniary disasters are formulated, it being easier to assume than to elaborate facts from consecutive reasoning as the imagination is more readily responsive than the understanding, because it illustrates from fancy in utter disregard and independence of facts or truth. There can be no effect without a cause, and the causes of which metalliferous deposits are the effects inhere in several conditions appertaining to systematised rock formations and the original constituent elements of the rocks themselves, individually and associated. Are these things then to be disregarded, or can they be with impunity, in the selection and appreciation of mining setts or concessions? If so it would resemble a mariner in mid-ocean, canopied by a starless sky, who threw his charts and compass overboard, abandoning himself to chance and the warning elements regardless of the warning lights—the beacons of intelligence—provided for his information, guidance, and safety. If the conditions essential to the success of mining are unrecognised or disregarded it will be practically as though they existed not. So far as human intelligence is concerned, which certainly involve haphazard results, the best of which gives countenance to and ratifies the truism "That where it is, there it is." Modesty or diffidence, whether assumed or real, might proceed by begging the question, which would not be free from objection. I will, therefore, affirm that everything existent, animate, and inanimate, organic and inorganic, are conditioned—that is to say, relative and dependent, or relative, dependent, and subservient to some thing or things else. Where but in mining are the fundamental conditions essential to its success disregarded to the extent that they certainly are in respect of that industry, and to which of all others they are most vitally important.

It has sometimes been said there is no blindness like that which refuses to see, which figuratively referred to mining implies an infatuation inexcusable except on the ground of veritable madness. The success of an enterprise depends on the sources from whence its commercial commodities are derived, which in metalliferous mining are lodes and veins minerologically constituted and relatively conditioned to specific geologic phenomona. Where these are the known and admitted causes, secondary though they may be, and undoubtedly are the primary, intermediary, and final, it must be conceded, are consecutively and inseparably associated to the perfection of a system and fulfilment of its ultimate design, it is there or thereabout—where suitable channels are known to exist—according to the physical order and mechanism of the rocks that their metallic treasures may be confidently sought for and most assuredly be found.

*Ione, Nevada, May 7.* ——— ROBERT KNAPP.

### UNITED MEXICAN MINING COMPANY.

SIR,—I have looked in the *Mining Journal* for some time past for the usual details confirming the telegrams published of the weekly returns of the Cayetano de la Ovejera Mine—the gross returns and the outlays. I do not know whether they have been published, but I certainly have not seen them in the *Mining Journal*, where one naturally looks for mining intelligence. As far as I can make out the telegrams stated the net returns as follows:—Week ending March 22 = $4000; March 29 = $5000; April 5 = $9000; April 19 = $7200; April 26 I have not seen; May 3 = $10,000; although the weekly return for May 3 has since been stated gross $16,266; $2980 outlay. No doubt the weekly returns have been regularly sent by Mr. Hay in his usual letters to the company, but why have they not been published? They, I hope, did not require, as is said the telegrams did, "official rendering." It would appear that the Mexican postal arrangements are much improved, as Mr. Hay's communications are dated from Guanaxuato, May 5, and published here on the 24th of the same month. With respect to the machinery which the engineer suggests he should order directly from the makers, it is to be hoped, "as the outlay is to be heavy," that the directors will ascertain what the cost is likely to be before consenting to be mere paymasters. A. S.

*May 27.*

### MINERAL WEALTH OF MEXICO.

SIR,—At the present time, when Mexico is so largely stepping into prominence, a few words relative to its mining, present and future, may not be out of place. It is not my purpose to refer to the unrivalled history of this field—far abler hands, and notably that of the great Alexander Humboldt, have done this long ago. The rapid strides which Mexico is making show her rulers to be keenly aware of the great future which is in store for her. Chief among its public promoters in the Department of Public Works (Ministerio de Tomento) being the Hon. Senor D. Diaz Covarrubias, author of works on topography, geodesy, &c., that must be ranked equal to the best which have been published in Europe on these subjects. Mexico has recently subventioned, if my memory serves me aright, three new lines of steamships connecting her shores with New York and West Indian ports. The Trans-continental Railway is making rapid progress, and will shortly have reached the capital. Moreover, branch lines extending to the various mining centres are constantly being constructed, and the first and oldest line, connecting Mexico with Vera Cruz by way of Talapa, Orizaba, &c., is known to yield handsome profits.

The climate of the Mexican Republic presents conditions of uniformity greater, perhaps, than those of any other land of equal extent. The lowlands, or what is called Tierras calientes, are hot, sultry, drenched with torrential floods, and rather liable to visitations of that dreadful scourge, the Vomito. The mountain slopes or Tierras templadas, embracing Puebla, Orizaba, &c., present the conditions of a subtropical climate (say, like Naples or Palermo). The uplands, or Tierras frias, are the most eligible, being bracing, healthy, and free from climatic excesses. It should be understood, however, that this division aforesaid, is meant chiefly to apply to lands situate in the latitude of the capital and to a comparatively narrow belt extending from it both north and southwards. But as the traveller is making greater progress northwards the natural declivity of the Central Mexican table-land is manifesting itself through an average higher yearly temperature, a diminished rainfall, and consequent drought and barrenness of the soil. This is the case all through the Northern provinces (river bottoms and local patches being excepted)—*i.e.*, the States of Sinaloa, Durange, Chihuahua, or those adjoining the great American Republic, whether on the east or west side of the Rocky Mountains.

The conditions of profitable mining are, like those of all sound industry, based on the co-existence of the three economic factors—land, labour, and capital. These are the conditions with which mining may, without which it cannot, profitably be carried on. Add to it other factors, such as public safety, easy communications, supply of raw material, skilfulness and steadiness of labour, and we have an epitome of the chief conditions indispensable to successful mining. Up to within a short period both the first and second of these prerequisites were wanting; they both now seem to be in a fair way towards permanency. The general conditions of successful mining, historically speaking, were first realised in the districts adjoining the capital—in Real del Monte, Guanaxuato, Zacatecas, &c. —consequently these were the first to be worked, and it was only slowly that attention began to be directed to those more northerly situated mines above referred to; and, indeed, the reason is only too obvious—that is to say the sparsity of the population. The great remoteness and distance to be travelled over, the barrenness of the soil, the lack of water and scarcity of general mining requisites—all this operated powerfully in the minds of would-be investors. It is only recently that these drawbacks are being overcome; but even now the energy, the circumspection of a mining manager are severely taxed to bring concerns to a successful issue in most of the Northern States. The great stumbling block in these localities is generally the question of labour. Native labour only is available, and this, combining Spanish haughtiness with Indian indolence, often sorely tries the patience of the most enduring manager. In order to prevent friction tutwork is resorted to as much as possible; underground, however, the wage system is the rule, and this, of course, will need time to be supplanted. In all dealings with native labour great caution is required, and nowhere is the *suaviter in modo* more necessary than here. The importation of Chinese labour would be attended with considerable difficulty, Chauvinism being more prevalent in Mexico than in any of the South American States. The mining slovenliness, too, of these populations is proverbial. From father to son they have carried on the business of ransacking the soil in the rudest and most primitive fashion possible, using notched logs for ladders, leathern bags instead of tubs, letting ground stand open; and it is only with a deal of patience that such habits can be uprooted and sound mining be implanted. Among the populations of the North tutwork for underground is more likely to take root—mining and stockraising being the only pursuits carried on in these localities. Other considerations which the mining manager in these lands will pay his earnest attention to are, the supply of water, the supply of fuel and a good provision of timber for underground workings. The question as to water storage must be left to the judgment of the manager in each individual case.

With regard to fuel, it may be observed that unless native or American coal be cheaply procurable, the reduction of ores by smelting had better be deprecated. With regard to timber, here again the individual judgment of the manager can effect a large saving through filling up the stopes judiciously. The "horses," however, which seem to be of frequent occurrence in North Mexican mines, render special care necessary.

Reduction of Ores.—Mexican ores, so far as they are free from base, have hitherto preferably been worked through the traditional

Mexican or patio process. This method, besides being wasteful in time, entails a large loss of quicksilver; but has the great advantage of saving plant and labour. The "cazo" process is applicable only for ores containing the silver as iodide, bromide, or chloride. The 'barrel amalgamating process" seems to have been abandoned chiefly on account of its limited capacity for work. The future, then, for working Mexican ores appear to belong to one of the innumerable Washoe processes, Hepburn and Patterson, Wheeler, &c., pans, with or without previous calcination and chlorination. Concentration, too, may often be desirable, and—as water is so scarce in Northern Mexico—may be undertaken by means of compressed air. Air jiggers, or—if water be available—Collom's concentrators, would seem to be particularly advisable. A process for reducing ores, which in late years has been devised and carried out successfully on the Pacific Coast of Mexico, is the new leaching process with hyposulphite (by Ottakar Hoffman). In a country barren, devoid of timber, brush, or firewood, such as the American plateau often is, this process would appear to be singularly suitable.

Where ores are allied with base metals, such as lead, smelting of course is the most rational plan to adopt. Either silver-lead is produced, or, in the case of cupriferous ores, regulus; which, carrying the precious metals in a concentrated form, undergoes the usual processes of desilverisation. In another letter I may make some remarks on Central America as a mining field. J. T. BLANCHARD, C.E.

*London, May* 28.

## WEST AFRICAN GOLD FIELDS COMPANY.

SIR,—Your correspondent "B," who dates from Somerton, Norfolk, is quite right. I can get no answer to my questions about this sum due to the company from seven directors for their qualifying shares. We want money to go on with. The property is a valuable one. We are told that 2000*l.* will bring it right, and instead of recovering this sum from those who are liable for it, the board send out a circular in which they ask us to subscribe the money. I have taken opinion on this matter and am told that the qualification in the advertisement having been stated as 250 shares, every director should have had it before he became one. If he had not that he was not qualified, and was acting illegally: I am also informed that in case we apply for a winding-up the Court will compel every one of them to pay up in full who had not got his qualifying shares.

I now propose that we, the shareholders, should subscribe towards a fund for taking legal steps to recover this sum, which (if the information I have from the secretary is correct that the board only took 700 shares) amounts to the balance due on 1750 shares, or 2100*l.* If this sum is paid up it will set the company on its legs; but if not let us apply to wind-up the company, if necessary, so as to secure and divide it. Again, I am informed that we, the original shareholders, who were led into giving our money by the statements made in the advertisements, and which were not fulfilled, have a remedy against every director whose name appeared over these statements. For instance, take the statement of sale for 40,000*l.* of part of the property—a statement of fact.

I am told hat a court of equity will compel them to refund any subscriptions given on the faith of this statement. I applied myself to the board to refund me my money on this ground some months after it had been made when I began to doubt it. They refused then, on the grounds that it was true, and a *bona fide* statement, and that the sale would be (or was) concluded. I have the letters of their solicitor and of the secretary to this effect.

I advise all shareholders to insist on knowing also what our board are doing now. We are getting no information from them as to this, and as to who is answerable for the present position of the company. We are told that it is owing to the misconduct of agents. Who is responsible for the appointment of these agents? Who appointed them? Was it the board or the Chairman? Perhaps he would answer this question himself if no one else will. He tells us all he has done for the company. Has he paid 500*l.* on his 250 qualifying shares? Is it true that there are dissensions in the board? That on Feb. 28 there was a board meeting, and that the directors present were unanimous in signing a letter calling on the Chairman to produce the account of his expenditure of the funds of the company on the coast of Africa with vouchers? Is it true that his brother directors have called on him to resign the Chairmanship of the company?

I also want to know the meaning of the auditors' certificate sent to us with the balance-sheet of Jan. 31. Messrs. Blunt and Kirby say—"We have compared this statement with the books, and believe it to show the financial position of the company." This is "queer" enough, but mark the second part of the certificate. "We have also examined the cash book of the company, with the vouchers and banker's pass-book." Nothing more. They tell us they "compare" one thing with another and "believe" it to be correct. But they also "examine" the only important points for which an audit is necessary, and they pass it over, and do not tell us the result, or do not even give us their "belief." I call on Messrs. Blunt and Kirby to tell us what it means. I say no more for the present, but if you will kindly give me space in a future Journal I may relate for the information of the public a little incident arising out of my having demanded information about these accounts, and which incident may be the subject of a question before long in another place.

*May* 28. SHAREHOLDER.

## UNITED STATES OF COLOMBIA.

SIR,—In the *Mining Journal* of 1838 to 1840 this country used to occupy a considerable portion of the letter-press, owing to the floating of, if I remember the title right, of the Mariquita and New Granada Mining Association, which was formed with a large capital to work the abandoned mines of Real de Lajas, Santa Ana, and Frias; abandoned not on account of their want of richness, but because of the War of Independence, which had driven the Spaniards out of the country, and killed or dispersed the slaves who had acquired a knowledge of mining. As public attention seems to be gradually attracted once more to this wonderfully rich country, a little information from one who has been occupied in mining for several years there might be interesting to your readers. The pioneer company had enormous difficulties to contend with, ships having to be especially chartered for the purpose of conveying men and stores, and often taking four months to reach the port of Santa Marta; there they were transhipped into flat bottomed boats, which carried 300 or 400 cargas, or mule loads, and were slowly poled up the Magdalena river by means of almost nude "bojas," whose only delight was to get drunk and shout their gross indecencies in the unfortunate passengers' ears, whose ignorance of Spanish alone prevented their understanding them. After two or even three months of this misery, those who had not fallen victims to fever (and it was said that in Mompose 15 Englishmen were buried from one boat alone), were landed at Honda, where they received instructions as to the part of the country they were to go to. The company working in those days the mines of Baja and Vetas, in the State of Santander, which were afterwards abandoned, principally on account of the rupture of a badly constructed dam which flooded the mine and filled it full of debris, drowning the men engaged underground. The mine of Pata del Gallo, near Villeta, in the State of Cundinamarca, and so called because the gold appeared like crows' feet in the matrix. The mine of Marmato, in the State of Antioquia, now known as the Western Andes Mining Company, and which still pays good dividends, but owing to the distance all machinery and stores have to be transported, making it a somewhat costly one to work. In those days the men who had to go to that part of the company's property were transported on men's backs, there not being roads for even the sure-footed mule, so that it was not at all an unusual thing for men to be a year before they touched a pick in their work.

Owing to the fact that Santa Ana was the most conveniently situated of all the company's properties, it became the principal place, as it is only about 20 miles from Honda. At one time there were as many as 175 Cornishmen employed there alone, and the directors, thinking it would give a great moral tone to the establishment, preferred sending married men with their families. According to the agreement with the Government, each English miner had to take two native apprentices, so that gradually miners became abundant.

A captain of the Royal Navy was thought to be the best person to govern this unruly set, but hardly the man to make a paying concern, as was shown by his having a dam built across a ravine, for the purpose of rowing a boat about. This little vagary is said to have cost the company 12,000*l.* Santa Ana was always a bunchy mine, but whilst the bunches lasted very rich grey silver ore was obtained running over 1500 ozs. to the ton. The mine when first opened was found to be worked only 20 fms. below adit in the very deepest, and this seems to be as deep as the Spaniards ever got when they had water to contend with, and when abandoned in 1874 it was down to the 170 below adit. What is wanted there is a deep adit coming up from some point near the river Guamo, which would intersect several known lodes, and if carried as far as Santa Ana would come in fully 100 fms. below the deepest workings.

The mines of San Juan and El Cristo de Lajas were never worked by the company, although not 10 miles from their establishment, but rich native silver specimens can be obtained from the backs of some of their old levels, and there is not the least doubt but that it would prove a profitable speculation to reopen them, as in the Spanish days they were considered far more important than those of Santa Ana.

Frias was never re-discovered until 1864, when an old Indian took some rich silver-lead ore to be assayed at Santa Ana, and he was finally induced to show where he found it. Curiously enough there were three small piles of ore left by the Spaniards, and this old man hunting stumbled across them, and on a search being made levels were found which were gradually developed, but very slowly, owing to insufficient capital in the first place, into what has now become the well-known Tolima Mining Company.

The company that has been recently registered as the North Tolima Mining Company lies a few miles to the north of Frias—hence the name, and has been formed to work the rich mines known as Calamonte. Some years ago when on an exploring expedition a piece of grey silver ore was found there by us which ran into a good many hundred ounces per ton; in fact, along this ridge of hills not a single stream is found which does not cut numerous lodes beginning from the north in Santa Ana. In the next valley—Lajas, then the North Tolima Company, then Sabandija—is beginning to show good ore, and is being worked by the Tolima Company. With that mine this list finishes, and about which the only thing to say is, look at the Foreign Dividend Mines List. In conclusion, the difference now-a-days to anyone desirous of travelling over this interesting country must be mentioned lines of steamers leaving Southampton, Liverpool, Saint Nazaire, New York, &c., for Savanilla, the port nearest the mouth of the Magdalena River. The quickest route is *via* Saint Nazaire; the steamer, which leaves on the 7th of each month, only taking three weeks to get to Savanilla, from whence a line of railway about 10 miles takes the passenger to Barranquilla, from which place the mail steamers leave five times a month and make the trip to Honda in from eight to ten days, so that under ordinary circumstances in five weeks by the French steamer, and in six by the English, which do not go direct, but make a detour to Jamaica and Aspinall, you will have accomplished what in former days took six months.—*Paignton, May* 27. H. J. C. WILLIAMS.

## THE QUICKSILVER WAVE AMALGAMATOR.

SIR,—Since writing you last February I have had an opportunity of practically testing the above machine on some ore from the Transvaal at Messrs. Johnson and Sons, assayers to the Bank of England and H.M.'s Mint. Some difficulty was experienced on the start to properly adjust the feed of the crushed ore and water, owing to the somewhat limited space where the amalgamator is at work, as it would be fed automatically from stamp batteries or other crushing machinery. Owing to this difficulty not having been overcome prior to this test trial it was considered advisable to pass the tailings through the amalgamator, the feed having been first properly adjusted. The amalgamators now in course of construction are made so that the tailings are always passed automatically through the amalgamator, the idea being to save any gold or quicksilver that may have escaped. The result was as follows:—The ore contained by assay before treatment gold and silver 17 dwts. and 3 dwts. The tailings after treatment assayed gold and silver trace only. These assays were made, and the samples taken by Messrs. Johnson and Sons. The greater portion of the gold was in such a fine state of division that it passed through a washleather with the quicksilver. When it is borne in mind that all the precious metals were extracted contained in the ore, and that the cost for treatment is under 1s. per ton, I think it will be admitted that this amalgamator leaves little to be desired. M. PARRY GOSSET, F.C.S.

## THE UNITED STATES OF COLOMBIA, TOLIMA, ORGANOS, &c.

SIR,—It is with some pleasure that I have perused the letters of your two correspondents on the above subject, as it is evident that the mines of the United States of Colombia have not received that consideration to which they are entitled at the hands of the investing public. I think it may be fairly said that there is no mine in that country which, so far as investors are concerned, is not either entirely successful or about to become so. The Tolima is undoubtedly first. As one of your correspondents pointed out this company last year made a profit of 44,000*l.*, which rate during the last four months has been increased to something like 66,000*l.*, while the last month's return, was the largest which has ever been made. This yielded a net profit of 7000*l.*, putting on one side altogether the profit of the exchange, which would probably amount to close upon another 1000*l.* Thus it may be seen that if the profits should be maintained at the same rate as the last return the mine would be making over 90,000*l.* per annum, while the capital is less than 100,000*l.* Personally, I do not look for continuous profits at such a rate; indeed, like your correspondent, I shall be perfectly satisfied if I see a yield at the average rate of 40,000*l.* per annum, and this, I think, may be regarded as in some degree certain. I should not, in fact, allude to the profits of the last month, but that I have heard privately, even a larger return than the last—7000*l.*—may be expected at any time. As regards the dividends, your correspondent is correct in stating that three dividends of 10s. per share will have been paid within the first half of this year, while there is left in hand an undivided profit of something like 30,000*l.*

The next truly successful mine will be found in the Western Andes, which has been for the last ten years making a profit at the rate of 500*l.* to 1000*l.* per month, and has paid handsome dividends during the whole of the period mentioned.

The Colombian Hydraulic Company made a profit of 5000*l.* last year. The returns have been recently somewhat lessened, in consequence of the necessity of opening out the mines on a larger scale; but it is intimated that, in the course of a very short time, the profits will be at a greater rate than anything yet seen by the company, notwithstanding that they have at times made as much as from 800*l.* to 1200*l.* profit in a single month.

The Orita adjoins this mine, and is on the same deposit; but, in addition to the advantage of having a comparatively small capital, it has other advantages in locality, water, &c., the importance of which, from a miners' point of view, cannot be overestimated. The success of this company is regarded as sure by all those who know it well; and, in view of the profitable returns which invariably attend the working of hydraulic mines when amply supplied with water and properly managed, I can hardly think the expectations which are entertained can be considered exaggerated.

At the Organos success seems to have been already attained, as I observe that this mine is now making regular monthly profits. A great deal has been made of a statement which appeared in the prospectus of this company that, with an average yield of ¾ oz. per ton, the company would be enabled to pay back the amount of its capital in dividends every year to the shareholders. This seems, no doubt, very sanguine; but the returns which have been made, even under adverse circumstances, seems to have yielded very nearly the average quantity of gold predicted in the prospectus, and hence, the capital of the company being very small, there appears little room to doubt that the statement referred to is well within the mark.

With one further example I shall have exhausted all the mines known in the United States of Colombia to the British public—the North Tolima has recently been floated, and according to the best experts the principal lodes of this property appear to favourably compare with those of the Tolima Mine, which it adjoins. According to the returns, there is one point where the lode is estimated to yield 2½ tons of ore per fathom, giving an average of 300 ozs. of silver per ton. By private letters I now hear, however, that the lode in one place shows a vein of solid ore over 2 ft. thick. It need only be said that the prospects of this concern so soon as the machinery is completed are all that can be desired.

I must apologise for the length of this letter, but as the United States of Colombia are so little known to the mining and investing public I trust that what I have written may not be altogether uninteresting to your readers.—*London, May* 23. COLOMBIA.

## THE PRICE OF LEAD.

SIR,—It would be very interesting to many at present engaged in metalliferous mining in England if some of your correspondents, who are in a position to give the necessary information, would answer the following questions through the medium of the *Mining Journal*:—1. In what state is the metal generally brought over to this country—smelted, or otherwise?—2. What is about the average cost at the principal mining districts, per ton, for bringing the metal down from the mine and loading on steamer, &c.?—3. Which are the principal foreign ports whence lead and copper are imported into this country, and what is the price per ton charged for carriage by sea and other costs incurred in delivering the metal at the smelting works in Swansea? It will at once be evident that in asking the above questions the object is to gain information about foreign competition; therefore any information on the subject will be acceptable A strong feeling exists in some districts that at the present low prices of lead foreign mines that have to find a market in this country cannot pay any legitimate profit, and sooner or later will have to obtain better prices, or come to a stop. E. B.

*Rhoscellan, May* 28.

## GOLD IN WALES—No. XLIII.

SIR,—I have laid aside this question several times, but with your permission I will take it up again with details, which in these dull times may probably interest some of your readers. The golden valley of the Mawddach, in Merionethshire, I believe has charms for the appreciative tourist, equalling in variety of picturesqueness any valley anywhere. Indeed somebody of note has recorded his opinion that "the 10 miles by road from Dolgelly to Barmouth is the most charming drive in Europe." Personally, greatly as I admire this drive I must confess to an old love reaching more fervently along that portion of this lovely valley which runs northward from Llaneltyd Bridge towards the source of the River Mawddach. It has always seemed to me unaccountable that so few tourists comparatively take the trouble to go as far as the Merioneth Trossacks and a little further on, to the two exquisite waterfalls situate near the confluence of the Rivers Cain and Mawddach, and called severally Pistyll-Cain (125 ft.) and Pistyll-Mawddach (85 ft.), the whole distance from Dolgelly being only between 7 and 8 miles. I spent a good deal of time last season in the neighbourhood of these falls, and I do not think a couple of hundreds of persons altogether visited them, the majority of them seemed agreeably surprised and delighted. Some of the minority, mere semi-animated sacks of sawdust, expressed in my hearing a sort of sorrow that so much pure water should be allowed to run to waste when they had to pay so smartly for the tasteless necessary of life of worse quality at home, and instead of drinking in deliciously the loveliness of the surroundings the result was merely the extemporised enjoyment of tepid sherry coolly diluted without admiration. Some there were who really believed that "a thing of beauty is a joy for ever," and complained bitterly that the Barmouth Hotels so seldom recommend this lovely drive to the falls. This seems very strange, but so it is. One is apt to think that a brace of cascades tumbling noisily over the most puzzling of the ancient rocks amidst luxuriant foliage would be a beneficial change for a few hours from the melancholy ocean. This is I hear about to be rectified. I hope it may. By the way the Dolgelly Hotels (except the Royal Ship) seem to be just as negligent in this respect as at Barmouth.

Barmouth is an odd little town, beautifully situated on the north side of the River Mawddach, just at the point where it enters Cardigan Bay. The estuary at high water is about 1 mile wide. The beach has a fine smooth sand, well adapted for sea bathing. The air is mild, owing to its being built at the base and sides of a barren mountain, which shelters it from the north and north-east winds. The view from the beach is strikingly interesting. The town viewed from the sea is certainly more odd looking than pleasing. But at an elevation of a few hundreds of feet at the back of the excellent Corsygedol Hotel the view looking towards Dolgelly at high tide is amongst the most charming to be found anywhere on earth; and reminds one at once of the Lago Maggiore and others of the Italian lakes. Nobody should visit Barmouth without climbing this easy ascent at the most propitious time—when the tide is in and the sun is shining.

The high road (now toll free) to Dolgelly trends along the slope of a mountain for 2 or 3 miles, skirted on the south by the river. This scene has beautiful variations of wood, interspersed with bits of the greenest of green pasture and bold bosses of nearly barren silurian rocks, and at the proper time the purpling heather and yellow furze. The few dwellings dotted about by no means diminish the picturesqueness. Drivers along the road in the darkness can enjoy the singularly pleasing advantage of the glowworm's light, and easily imagine thousands of elfin dances going on all at once

Cader Idris (1 mile high) towers above the rest of the mountains. In short there are such varied groupings of beautiful features of landscape along the whole line of road that it is scarcely possible for human being clothed and in his right mind to travel it (when it does not rain) without feeling continuously the most delicious thrills of pleasurable satisfaction. About midway on the left hand is the celebrated Clogau Gold Mine, which in 1862 got 4566 ozs. of fine gold from less than 14 tons of quartz, and altogether in the year 8185 ozs. from 1260 tons, which was sold to the Bank of England for 31,207*l.* Hereabouts, too, lives the venerable John Parry, who may not at all inappropriately boast of having extracted the most of it, and that too by Britten machines of the olden type.

Llaneltyd is about 2 miles from Dolgelly. In 1809 commons and waste land of this village were enclosed to the extent of 4164 acres, and applied scripturally in the manner, "Whosoever hath, to him shall be given." There is a fine salmon pool near Llaneltyd Bridge, and much might be said of the alluvial gold hereabouts. The scenery throughout this parish is richly diversified; the views along the banks of the river are singularly picturesque, and in some places really romantic. Of late years the views have acquired additional charms from the extensive plantations which adorn the mountain sides at intervals. About 3 miles from the village is the noted waterfall of Rhaidr-Du, more generally called Dol-y-Melynllyn, from its proximity to the beautiful seat of that name, belonging to Mr. Williams. The tidal River Mawddach is navigable for small craft as far as Maesygarnedd, ¼ mile from the village, and the tide flows occasionally up to the bridge of Llaneltyd.

On the eastern side of the Mawddach is the large parish of Llanfachreth, containing an unmeasured as yet area of 54 square miles; the surface of which is very boldly and interestingly varied, having in parts very rocky eminences. In 1806 about 9896 acres of waste lands were scripturally appropriated by Act of Parliament, and a large portion of it is now under culture. The surrounding scenery is strikingly diversified; rugged grandeur appears to rival with rural beauty and extensive plantations. Nannau in this parish, the seat of Mr. John Vaughan, is 700 feet above the sea, and it is a first-rate constitutional walk to it from Dolgelly, the whole distance being against the collar for about 3½ miles. Hereabout is what is known as the Precipice Walk, little more than a sheep track, terminating near the Glasdir Copper Mine. It is, however, a place of pleasurable resort, particularly of parties who prefer walking in single file. Curious crystals of pyrite pseudomorphs may be found along this rocky ridge. The view is delightful. The Glasdir Mine Company sold about 500 tons of copper ore in 1882 for 2200*l.* In this parish too is the Turf Copper Mine, so named from the fact of peat ashes containing copper having been sold therefrom years ago for some 8000*l.* From this circumstance the mountains are thought to be

impregnated with copper. In fact they undoubtedly are. Above the seat at Nannau is a lofty rock, the top of which is encircled with a rampart of loose stones; it is named Moel Offrwm, "the hill of sacrifice." Not far off the Cwmheisian Mine is a chalybeate spring, termed Fynnon Goch.

Traws-Fynydd, on the opposite side of the river to Llanfachreth, is the next and last parish of which we have at present to treat. Its area is about 80 square miles (25,000 acres), and is mountainous throughout nearly its entire extent. The village is on an eminence in a very exposed and hilly district. People hardly think of dying in this healthful locality. Much more than half the parish consists of barren hills, affording the least possible pasturage for the prettiest little sheep and the queerest young cattle. In this district can be realised the dreariest of wilderness, rocky and romantic grandeur, and the softer beauties of rural arrangements. The bench mark of the Ordnance Survey on Trawsfynydd Church is at 771·794 ft. above the sea level at Liverpool. The lake called Rathlyn is a fine sheet of water, remarkable for a kind of perch having the lower extremity of its backbone oddly distorted. The interesting waterfalls Pistyll-Cain and Pistyll-Mawddach already alluded to are in this parish, also the Gwynfynydd Gold Mine, to which we shall presently refer.

*London, May 26.* ——— T. A. READWIN, F.G.S.

## SLIKENSIDES.

SIR,—In reply to Mr. W. Brown, I beg to state that the phenomenon described by John Whitehurst in 1786 as having occurred in Derbyshire mines is founded on fact. The explosion, or at least the breaking up of the rock, which took place after "lacing," it is undoubted proof of the great state of tension the "laced" limestone was in, and which state of tension we now know must have been produced by the sliding of one portion of the rock-mass upon another.

Slikensides mainly consist of grooved, straight, and sometimes curved lines running in a certain direction, and not necessarily parallel for long distances. There may be different setts in the walls of the same lode, and I have even found evidence of three setts making acute angles with each other in a small hand specimen. In lodes these lines are often coated with some ore. In Derbyshire mostly galena, in Cardiganshire iron pyrites or galena, in Cornwall may be copper pyrites as well, and in rare instances nickel and cobalt ores, in Borneo and Almaden cinnabar. In other words, the coating depends, as might be expected, on the nature of the mineral contents of the lode.

Sometimes a slikenside, or grooved polished joint (German *harnisch*), from its supposed resemblance to the armour of an ancient knight, runs for a long distance in a uniform direction along one wall—usually the hanging-wall of a lode. When such is the case, it is evidence of a pretty uniform movement of the country on that side of the lode in which the slikenside occurs. But when slikensides occur coating joints inside lodes, and having lines which constantly vary in direction, it is evidence of very local movements of the ore and vein stuff in the walls of the lode. All rocks, after having experienced such movements, are not left in such a high state of tension as the limestone of the north, either because the degree of movement has been less, or, on account of the different physical nature of the rock, or because of its relatively less degree of hardness when the movement took place. Thus, in the clay-slate of Cardiganshire and in the killas of Cornwall slikensides are brittle, indeed; but by no means exhibit the strange properties of those of the north.

I conclude by quoting an admirable description of "lacing," to be found in Farey's Derbyshire:—"In gang mines, where a slickenside runs through the vein, the miner avails himself of a curious property attending such veins, by drawing laces, stoopes, or nicks at about 6 in. apart and 4 in. deep, with the point of his pick from top to bottom of his face of work, which he then leaves for several hours, and, on his return, finds all the vein-stuff is furrowed, spelled, or slappeted off, and laying on the sole, ready got to his hands."

*Notting Hill, May 28.* ——— E. HALSE, A.R.S.M.

## WEST POLBREEN MINE COMPANY.

SIR,—I have read the letter in last week's Journal at the instance of Mr. J. B. Reynolds, written over the signature of Messrs. Learoyd and Co., and my reply to it is—(1.) If my letter be grossly false and inaccurate, as they allege, why do Mr. Reynolds and Messrs. Learoyd and Co. not point out the alleged falsehoods and inaccuracies to the readers of the *Mining Journal* in place of indulging in such vulgar phraseology as "a fouler of his own nest," &c.—(2.) I am one of the nine larger shareholders in the concern, and I am very much dissatisfied with the changes that have taken place in the ownership of the shares and also with the London management of the mine, and, as stated in my circular, the object I have in view is to have an independent investigation of the working of the mine since its commencement down to the date of last meeting, followed by a report thereon for the information of the shareholders, and in the event of it being found that the mine is worth carrying on I am desirous that properly qualified officers be appointed to conduct the business, and if there is no reasonable prospect in the mine paying in the near future I do not hesitate to say that such a fact ought to be made known at once and the mine stopped, and the company wound up forthwith.

It is no doubt annoying to Mr. Reynolds, as Chairman of the company, to have it published that at one time he was the registered holder of no less than 3000 shares in the mine, and that these had dwindled down till at the date of last meeting he had only three remaining; but the only apology I can make for this is that it is true, and why should the shareholders not know the fact? It is surely an ominous enough circumstance that the Chairman of the company has divested himself of his shares to such an extent, and affords sufficient justification in itself for the step I have taken, unless indeed the company is to be carried on entirely for the benefit of the officials and Mr. Reynolds, in whose office its business is conducted.

Any shareholder who takes the trouble, as I have done, to examine the register of shares book will be as much surprised as I was at the multiplicity of dealing transactions Mr. Reynolds has had with his shares as compared to other shareholders, and anyone taking the register of shares book in one hand, and following the history of his operations with his shares, and taking his printed speeches in the other, I venture to maintain he will have much difficulty in reconciling the facts in the one with the drift of the other. No dealer in shares should be Chairman, nor have the management of any company in his own office, and at the same time deal in its shares. The Glasgow Stock Exchange has recently passed a rule to this effect. It is also, perhaps, irritating to him to have it suggested that a mere clerk in his own office is not a proper auditor; but who ever before heard of a man being practically his own Chairman, secretary, auditor, and sharedealer, all within himself.

For the information of your readers, and in reply to the insinuation above referred to, I have to state that I still hold every share I ever possessed in this company, and I have never held a single share or stock in any English concern but itself, nor has anyone ever held any share or stock for me. Further, I have never dealt in shares or stocks of any kind except to a very trifling extent for investment, and never before have I had occasion to write in reference to the conduct of the business of any company in which I was interested, directly or indirectly, so that the insinuation "that I have gained unenviable notoriety by such work (fouling my nests) is simply untrue, and is evidently intended to make the public believe that I have issued a damaging circular for my own ends, in order, presumably, that I may thereby run down the shares of the company and buy in more shares at still lower prices. I may inform the shareholders, however, that I have no intention whatever of increasing my holding. I bought the shares I hold for an investment, on the faith of Mr. Reynolds' representations, and how the nominal price fluctuates on the market in the absence of a dividend is of very little importance to me or any legitimate investor!

No writing of mine or any other person can alter the character of the mine itself in the very slightest degree, and it is only those who deal in differences, and not legitimate investors, who have anything to fear about the fluctuation of the nominal price at present. With regard to Messrs. Learoyd and and Co.'s threat as to legal proceedings, I have only to state that Mr. Reynolds and the officials of the company can take whatever steps they may think proper, and when they do so I will endeavour to meet any action they may choose to bring.—*Glasgow, May 28.* ——— JAMES MCMEEKEN.

## GREAT WHEAL VOR MINING DISTRICT.

SIR,—Seeing that attention is being directed to this district and several mines therein, I would particularly call to notice the unwrought portion of the old Wheal Vor sett, from Borlase's shaft to the eastern boundary. This piece of mining ground is believed to be by every practical miner who knows it, the very best, without exception, in the whole district. It is parallel with Wheal Metal, where the same cross-course made all the riches there; and here the main lode at the 10 fm. level, where left off by the last company is reported by the late manager to be 6 ft. wide, and will yield 1 cwt. of tin to the ton of stuff at that shallow depth, which at a deeper level, and in connection with the cross-course referred to will, there is no doubt, be found equally as rich as the old mine in its brightest days. One pumping-engine will be sufficient to carry this mine to a considerable depth, and drain any water that may flow from the shallow workings of the old mine. This property, I unhesitatingly affirm, is number one in the whole district, and the wonder is to those knowing the fact that it has not been in active operation long since.—*Breage, May 27.* ——— A. R. M.

## FLAGSTAFF DISTRICT COMPANY.

SIR,—I am sure that all shareholders will be interested in your remarks in last week's Journal respecting the affairs of this company. With your permission I should like to observe that the Vallejo, Eclipse, and the City Rock Mines have all had to contend with the same non-productive formation at the same depth as the Emma and the Flagstaff. The Vallejo and the City Rock (the former adjoining the Flagstaff and the latter near it) got practically no pay ore during the first two years of their working; but at that date (getting through the "poor zone") they came upon abundance of rich ore, and both companies are now well known in Utah as great successes.

Seeing that the Flagstaff main shaft and winze have been successfully sunk to so great a depth below all old works, I can scarcely believe that the comparatively small further sum necessary to open up the new level for connecting the shaft and winze and reaching the new ore will not be forthcoming. I find that only 90 out of nearly 600 shareholders have taken debentures. I also find that our directors, besides having taken no fees for a year and a half, have advanced to the company 1250*l.* in cash for sinking the winze and shaft. Thus our directors evidently believe in the mine, and may it not be hoped that their faith and example will induce a sufficient number of the shareholders who have not yet subscribed to come forward and take debentures to a sufficient extent to enable the paying off the petition and at once restarting the mine. F. BURT,

*Hounslow, May 22.* A Large Share and Debenture Holder.

## THE MANCHESTER SHIP CANAL, AND THE ANGLESEY MARBLE QUARRIES.

SIR,—In anticipation of an early commencement of the above-mentioned gigantic waterway to Manchester the numerous quarrymen, and also the labouring class on the north coast of Anglesey have been thrown into a lively state of excitement since the passing of this bill by the Lords Committee, as it is well known that all facing, coping, and general outside stone work, nothing in quality or price is at all likely to compete with Anglesey marble. Granite is the only stone that is equal to it (but not superior), either in quality, durability, or appearance; but the ruinous price of shaped or dressed granite, however roughly, puts its general use for the canal at once out of the question. Therefore, besides the quarrymen and labour, the proprietors of these great and ancient limestone and marble quarries have reason to rejoice at their present prospects, as in addition to the enormous demand which must necessarily arise almost immediately for their produce, they may with every confidence depend upon an abundant and continued demand for the stone for the next 30 years, at least, for one or other of the manifold uses for which it is (above all others at a corresponding price) so peculiarly adapted.

The principal quarries of the island and from which the most dense and largest blocks of stone are obtainable are the Great Dinorben, the Anglesey Consolidated, and the famous Meyrick Quarries, and the Penmon Quarries. There are other quarries situated several miles westward near Moelfra, from which stone was formerly obtained. Active preparations are now going on at the Great Dinorben Quarries, with a view of placing them in a permanent position to meet the existing demand for the stone and marble, as well as stone for the Scotch and other ironworks which are now waiting for supplies of this exceptionally valuable fluxing material. These quarries are considered the most gigantic and valuable of the kind in Great Britain. There is a face of rock already exposed for immediate development nearly 300 ft. in height and over 1000 ft. in length, from which any thickness of stone from a few inches to several feet are readily obtainable.

The marble beds in these quarries are more numerous and diversified than in any other single quarry in the kingdom, the markings are pronounced to be unsurpassed by any other British marble, and so abundant that it will be used extensively in the construction of the ship canal if the demand for it should not equal the supply for other more profitable purposes. Immediately on the east of above-named quarries are the extensive quarries known as the Consolidated, from which enormous quantities of magnificent blocks have been exported to nearly every part of the United Kingdom. These quarries belong, or did formerly, to General W. F. Nuttall. They are now about to be handled by an experienced quarry engineer, Mr. F. Wilkins, in the capacity of managing director of the company which has just been formed for their development, and will, no doubt, through his skilful management ere long resume their former state of highly remunerative production. Still further eastward near to the entrance of Menai Straits are the valuable Prumord Quarries, leased from Sir Richard Bulkeley. These quarries are the only place where any attempt has been made to utilise as well as economise the stone by the employment of machinery. So great is the demand for this stone that at times the machinery has been kept at work night and day—from Monday morning until Saturday night. Notwithstanding I have never seen nor do I believe a printed circular has ever been issued, offering their stone for sale in a similar manner to that adopted by all the great Yorkshire, Cornish, Portland, and Scotch quarries. The famous Meyrick Quarries yield the great blocks of stone with which the Holyhead Breakwater is chiefly coped, as well as the enormous blocks forming King George IV. memorial at Holyhead, and also the piers of the Britannia Bridge were built are located near the west entrance of the seaside resort of Red Wharf Bay, and only a few minutes' walk from the ancient Min-y-don Hotel.

The importance and singular value of these quarries will be readily inferred in conjunction with the Manchester Ship Canal from the fact that the contractor of two of the most gigantic stone structures in the kingdom—the Holyhead Breakwater and the Britannia Bridge over the Menai Straits—were both careful to acquire these quarries, which for the supply of unusually large blocks are acknowledged to be the most valuable in the island. According to the report of the late foreman of these quarries, he has quarried out blocks of stone from which he obtained as many as six blocks, each measuring 25 ft. long, 3 ft. 6 in. broad, by 2 ft. 9 in. deep, and that the naturally sheltered position of the quarries admit the shipment by the aid of shear legs alone of blocks of 25 tons weight from the end of the existing causeway. These quarries have a developed face of exposed rock ready for working of over 600 ft. in length, the beds varying from 1 ft. to 10 ft. in thickness, and so strikingly defined are the partings that they are all more or less distinctly visible from one end of the quarry face to the other. The beauty of the immense marble pillars obtained from these quarries as well as other marble blocks are well known, some of which can be seen at Bordorgan Hall and other places. The Marquis of Anglesey's agent, Mr. W. E. Jones, referring to a bath at Plas Neuydd, cut out of a block of stone from these quarries, states—Although fixed about 80 years ago the marble still retains its variegated colour and polish, and is much admired. These quarries have been acquired by Mr. Edmund Spargo, of Liverpool, and are about to be developed by London capitalists, who contemplate the immediate erection of an extensive series of most modern sand saws, rubbing, dressing, turning, and polishing machinery, and otherwise to equip the quarries with every requisite for their most extensive and economical development. It will be seen that there are some grounds for the present excitement of the working class resident in the neighbourhood of the several quarries above referred to. A. A. B.

*Liverpool, May 28.* ———

## OWEN VEAN AND TREGURTHA DOWNS MINES, MARAZION.

SIR,—Considerable interest in the above is manifested in the locality, and a few remarks may not be uninteresting to readers of the *Mining Journal* just as the new stamping machinery is about to commence working. Somewhat more than 50 years ago, when tin ore sold for less than 35*l.* per ton, the Tregurtha Downs were the easternmost of a run worked as the Marazion mines, of which Wheal Virgin on the same lodes formed the western boundary. Wretchedly managed, according to common report, they yet produced very large quantities of mineral, and notwithstanding the low price prevailing the returns equalled the expenditure. The waste may be imagined from the fact that since the suspension of mining operations 15,000*l.* has been received for tin sold from the burrows or heaps of rubbish at surface on Tregurtha Downs alone.

The salient and most favourable features of this property appear to be the shallowness of the mine and proportionately light working expenses, the very productive tin ground commencing from the very adit or surface level and continuing to the bottom 50 fathoms deeper, and the number of east and west lodes in the grant, the three principal of which are embraced within a distance of 45 fathoms, and workable by cross-cuts from north to south. These considerations in connection with very strong reports by reliable authorities of the past and present day, together with the positive assurances of persons who, when young, worked as miners here, appear to have decided the present company to work it. The machinery and plant provided for this purpose cannot be surpassed, and a visitor is struck with the perfect system and order, as well as the just proportions of the appliances in each department. Sinking the engine-shaft is now in progress with the object of developing the whole of the lodes 20 fathoms below the present workings, meanwhile the south lode alone will furnish tinstuff to supply the stamps from the ample reserves actually laid open and proved.

Pneumatic stamps said to be capable of reducing from 60 to 80 tons of tinstuff per day and a splendid new engine to drive them will be set at work within the next fortnight, and with the almost unlimited supply of tinstuff which the agents have proved by the use of a small stamping mill in the neighbourhood to be equal, if not superior in produce, to the tinstuff from most of the deep and expensive mines of the county, I shall be much surprised if this does not immediately takel eading rank among tin mines. TINNER.

---

DIAMONDS IN AUSTRALIA.—The diamond field of Bingera, New South Wales, bids fair to rival in richness the famous Kimberley District of South Africa. During the last few months hundreds of diamonds have been discovered, the size and number increasing with the depth of the diggings. The work of the miners has been seriously impeded for want of water for washing purposes, but recently a plentiful supply has been struck at a depth of from 50 to 60 feet; the result being not only increased activity on the part of the diamond miners, but also the formation of new diamond mining companies, and the taking up of nearly all the land in the district for diamond mining purposes.

---

MARINE BIOLOGICAL ASSOCIATION. — Professor Huxley has undertaken to be the first President of the Marine Biological Association. It is probable that the first marine laboratory and experimental station of the association will be established at Plymouth.

---

INDUSTRIAL PROGRESS OF NEW SOUTH WALES.—At the end of the year 1882 there were 166 mills in the colony for grinding and dressing grain. The aggregate horse-power of these mills was 3025. The number of hands employed was 703, and there were 403 pairs of stones in operation. In 156 of these mills the motive power was steam, amounting to 2929-horse power. The general total number of manufactories, works, &c., in the colony at the end of the year 1882 was 3036, employing a total of 32,660 hands—30,556 males and 2104 females.

# Meetings of Public Companies.

## CARTAGO (LIMITED).

The first ordinary general meeting of shareholders was held at the City Terminus Hotel, Cannon-street, on May 24,

The Right Hon. Lord CLAUD HAMILTON, P.C., (the Chairman of the company) presiding.

Mr. F. J. WARNER (the secretary) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, I can hardly tell you how glad I am to meet you here to-day, and to be able to present to you Mr. Pinelli and Mr. Skertchley. You are all, doubtless, aware that this is our statutory meeting, which we are bound to hold within four months of the incorporation of the company. Now, in order to summon a general meeting we are obliged to give a considerable amount of notice, and that rendered it necessary for us to issue the notice of the meeting before we were aware that these gentlemen would have returned to this country in time to attend you. You can imagine how nervous I was at the thought of having to meet you without the report of Mr. Skertchley. You know that quite lately three vessels have been lost in the Atlantic, carrying down with them 137 passengers, showing the perils of Atlantic navigation; and, therefore, it was with the greatest satisfaction that a few days ago I received a note from our friend, Mr. Warner, to say that these gentlemen had arrived. You are all aware that this statutory meeting is not one in which the directors offer resolutions for the acceptance of the shareholders, but it is an excellent opportunity for you, gentlemen, to ask any questions, and to obtain any details that you wish to have. I am, therefore, happy to state that our friends, Mr. Pinelli and Mr. Skertchley, both being here, will be able to give you the most accurate details that you may require to obtain information upon. I feel it my duty at starting to say how gratified I am at the extraordinary success which has attended this undertaking. We all know that of all things risky and uncertain perhaps mining stands first, and many people have had to repent their confidence in mining undertakings; but I do not think that will be your position at all, as I will presently give you reason to consider. The remarkable response made to the circulars when this company was formed created a great amount of envy and hostility in the minds of certain individuals, and this found prominent exposition in one of the papers, which our very trustworthy and high-minded broker—a man standing very eminent in his profession—did not select as one of the mediums of advertising the company. This fact created the bitterest hostility, and there were thundering letters from a certain person who stated that he had no confidence in the thing, and this, that, and the other, and warning everybody that the whole thing was not to be depended upon. Then another paper in noticing the company made a list of the most monstrous misrepresentions and absurd statements that it is possible to conceive. People who understand these things are aware what "black mail" is, and how easy it is to buy venal pens and turn them from hostility into mediums of illegitimate flattering. Some people have said "Surely you are not going to leave these detailed attacks unanswered," but I said "as long as I have anything to do with this company there shall be nothing in the shape of 'black mail' or the purchase of venal and dishonest pens," and who was right? At that time our shareholders already numbered over 1500, and out of that number only 50 persons were in any way deceived by those impudent misrepresentations, and, therefore, we may assume that the rest treated them with the silent contempt which they deserved. I had letters asking me if I could allow these detailed attacks to remain unanswered, and I said "certainly, unless these people will put their names and render themselves liable for their falsehoods," but they take care to do no such thing. Well, gentlemen, that was the way we were treated by hostile people. I may say that Mr. Skertchley is no stranger to Venezuela, being well acquainted with it for years, and knowing Mr. Pinelli for a considerable time. When he went over he found Mr. Liccioni, whose name was prominently and deservedly put in our prospectus, carrying out everything stated by him previously. He wrote letters of introduction for our agent, Mr. Skertchley, and did everything to facilitate his operations there. You must remember that this was at the time of year when Mr. Liccioni, as the President of that wonderful mine, the Callao, which is the greatest success known in mining operations, was making up his accounts and was very much pressed for time. Nevertheless he most liberally and energetically bestowed his time and his exertions on our behalf, and any questions you wish to put with regard to the operations at the mine and what passed between Mr. Liccioni and our agent will I am sure be answered by Mr. Skertchley in the

clearest detail. Well, the result of all his enquiries was most satisfactory. Amongst the ridiculous attempts which were made to run down this property one wiseacre said—"How is it that you pretend to have water-power when no other companies on the same river profess to have it?" The answer is that our property contains a high bank with a fall of 20 ft. from the rock. You cannot have water-power in a dead plain, but you can when you have as we have a fall of over 20 ft. Everything has turned out as favourably as possible. Of course, you are all aware that every country has its own laws about registration and about title-deeds, transfers, and all those very necessary details, which, of course, take time and legal formality. Documents had to be searched in Caracoas, and, therefore, Mr. Skertchley, irrespective of his mining enquiries, had to see to the transaction of this legal and formal business. He found everything satisfactory as regards the title, and as regards the transfer, and the specimens he has obtained from our property at Cartago are all of a most promising character. Probably you are all aware that in these quartz formations, generally speaking the quartz near the surface is not nearly so rich as when you get deeper down. At present we have only commenced, I may say, superficially, but the specimens Mr. Skertchley has brought home, which were taken from near the surface, show an amount of gold which is most satisfactory—1 oz. 18 dwts. per ton. However, Mr. Skertchley being more accustomed to these matters than myself he will give you the exact details of the assay made here since he came back. You have all read I presume, the report that has been sent toyou from Mr. Skertchley, not only in regard to Cartago, but on the very important properties that have been thrown in our way by the energy and advice of Mr. Liccioni, a gentleman of the greatest influence and weight there, owing to his position in connection with the Callao Mine, which, as you know, is an immensely rich mine, and is paying larger dividends than any mine in the universe. He in his zeal for this company has negociated the transfer of the Tigre property, which is within 2 miles of Cartago, and has a proved amount of wealth that nothing can gainsay. Our ore from Cartago can be taken to the machinery which is already erected, and in fair working order at Tigre, which, as I say, is within 2 miles of Cartago, and which has produced an amount of wealth only exceeded by Callao. It has only been worked in a small, limited, way, but when the arrangement which Mr. Liccioni has enabled us to offer you, and which he has spent his time in procuring for us, is concluded, we shall within four months be in a position to have returns sent from that mine. That mine, I may say, has only been discontinued owing to a certain want of concert among the existing shareholders. The machinery and the shafts are there and everything is in such a position that a small amount of capital will immediately put them in working order. Mr. Skertchley has been over the whole of the extensive machinery, and the whole of the works, and he has given you his opinion as a practical engineer as to how soon it will be brought into a paying state. I want to tell you the history of this Tigre concern, for it is a curiousone. A very important mine called Caratal was worked on a very small scale, with only five stamps, and proved very wealthy. They began with a small capital—10,000*l.* Then the Tigre property was added to it, and it now appears that the shares, which were of 500*l.* each, were mainly held by a few large shareholders, the larger proportion of them being wealthy land owners. The joint properties are valued at the least at 40,000*l.* or 50,000*l.*—a much higher value is placed upon them in the country. Tigre was amalgamatod with Caratal because the former had no machinery, and when the amalgamation took place the capital represented was 20,000*l.* Of the shares 80 out of 100 were held by a few wealthy men and the remainder were held by small shareholders. The consequence was that when they wanted to get more machinery, and to spend more money on the mine, the wealthy men agreed to advance 15,000*l.*, but the smaller shareholders declined to do their part. Of course, the large shareholders, thereupon said—"If we are to be the milch cow, to supply the funds while the other 20 shareholders subscribe nothing our capital will go to enormously increase other people's shares, and they will benefit by our expenditure." They did not quite like that arrangement, hence the offer which Mr. Liccioni has secured to us. That is the history of the disunion which led to the suspension of the works. The Tigre and Caratal properties together proved enormously wealthy, and like prudent men the owners increased the number of stamps to 20 out of the profits earned, and all the deadwork was also paid for out of the profits. We have in Mr. Skertchley a man who knows what he is about and does not take mere verbal answers. He took the mill book and ascertained for himself that in about eight years, during which the mines were working, 140,000*l.* worth of gold was extracted, and out of that something like 50,000*l.* or 60,000*l.* was spent in materials, machinery, and deadwork. Therefore, the real position of the Tigre property was this—they had spent 20,000*l.* of capital and 60,000*l.* of profits on wages, salaries, machinery, and deadwork, and the property is valued now by those who understand the thing at the least at an additional value of 50,000*l.*; so that you have a value of at least 120,000*l.* offered to you through Mr. Liccioni's exertions, for a payment of 30,000*l.*, which need not be made for some time, and 30,000*l.* in shares. Mr. Liccioni has urged us to do this, and gave us the offer for four months, and it is now in your hands if you like to keep it. I may say with regard to Tigre that besides the expenditure on machinery and deadwork, in the eight years during which the mine was worked, 48,000*l.* was paid in dividends, and there is every reason to believe that if we spend a few thousands of pounds in putting the machinery in order and sinking the shaft, cutting the lode, and other works of that kind, we shall be making returns within four months after the commencement of operations. That is an offer which, I apprehend, ought not to be refused, and we have asked Mr. Liccioni to accept the offer placed at our disposal. Do not think we have forgotten Cartago; nothing of the kind. But the whole of the deadwork has to be done at Cartago, and we propose to work the ores coming from that mine at present with the machinery already erected close by, and perfectly capable of undertaking that work. We do not want to disparage Cartago at all, or to suggest that it is not of the value recently attributed to it; but we know that it would take a long time to get the machinery into the country in the first place as access is not very ready, and when it is got there it will take a long time to get it up and have it in efficient order. Just now there is a demand for Venezuelan mining property, and Mr. Skertchley tells us that the means of transport inland are very difficult and insecure, and that such as they are, they are engaged for the next three months at least. Therefore, you cannot get any returns for 12, 14, or more months if you wait until the machinery is put up at Cartago; while with this offer you will be able to commence profitable operations at once. I have told you that the opposition to Cartago has fallen to the ground; but I may say that some person surreptitiously and by bribery got hold of a list of some 250 of our shareholders, and set to work and sent round a most scandalous anonymous attack on the company to those shareholders. Of the 250 shareholders, except about 30, they were sensible enough to take no notice of it. Explanations were asked for by those 30, and all were satisfied except two, who apparently take an entirely contrary view to the 1500 odd shareholders who have done us the honour to place their names on our lists. We could not, of course, expect perfect unanimity about the Tigre arrangement; but I hope before they throw away such an unexpected and extraordinary chance of making immediate returns the shareholders will well consider the matter before listening to any of the suggestions made against it. We shall always take you into our counsels and let you know everything, as we felt it our duty to do instantly in this case. We only knew of the offer on Mr. Skertchley's return last Monday week, and we at once sent a circular to every shareholder asking for an expression of opinion on the proposition. I may say that a great many of our shares are held in the colonies—at the Cape of Good Hope, in Newfoundland, and in the West Indies—and of course in those cases we could not receive any opinion yet; but we have already received assents from 830 shareholders, representing in value 51,442*l.*, and we have received five dissents, representing less than 100*l.* Next week is the "Derby" week, so I will quote the odds at 51,443 to 100, and leave you to judge whether you would like to have that sort of prospect. The Chairman went on to refer to a letter received from a Birmingham shareholder with regard to the purchase of the Tigre property, and mentioned incidentally that Mr. Liccioni had been offered 100,000*l.* for the properties which were placed at their disposal for 60,000*l.* in cash and shares, but he had refused to do so, although some persons had had the impudence to write to him aspersing Cartago and its directors, and asking him to withdraw his name and co-operation from it. The shareholder who had written dissented from the proposition on completely erroneous grounds, and he only hoped the gentleman was present and had heard the matter explained.

A SHAREHOLDER: Is the gentleman a shareholder?——The CHAIRMAN: I suppose so; I have not looked. Mr. Liccioni is the holder of 500 shares.

A SHAREHOLDER: What number of shares does the writer of the letter hold?

The SECRETARY, after searching the register, said the writer held 20 shares.

Mr. SAMPSON: Will you inform us how much money we have got, and how many shares have been subscribed for?——The SECRETARY: The number of shares allotted has been 80,756, besides the vendors' shares.

Mr. SAMPSON: Have the deposits and calls been paid on them all?——The SECRETARY: On the greater part. I should say that about 15,000*l.* has been received on the shares. No call has been made, and the allotment money has not been pressed for in the meantime.

Mr. H. W. SPRATT: I should like to hear from Mr. Skertchley an estimate of the cost of workir g Cartago, and the cost of working Tigre separately, and then what the cost would be of working the two together. That will give us an idea whether or not we should buy the other property. We know that Mr. Liccioni has a great reputation, and that he will lose it if he recommends us to take anything that does not turn out well; and I have no doubt that he would refuse to associate himself with a company like this if he did not believe in its future, and that he would not recommend such a property if it was not worth buying.

A SHAREHOLDER: What would be the cost of the machinery for Cartago alone?——The CHAIRMAN: We have not got a complete estimate yet, but we want to spare calls, and work with the machinery which is within two miles of us, all ready for working.

Mr. BERRY pointed out that as only 80,000 odd shares had been subscribed for, and the vendors would receive 100,000 the vendors would get too large a proportion of the profits.

The SECRETARY replied that that was specially provided for in the Articles of Association. They could issue the remainder of the shares if they found that the vendors were getting an undue proportion of the profits.

Mr. JONES opposed the purchase of the Tigre property, and said he would rather wait for 18 months or two years until the machinery could be put up at Cartago. He had subscribed for shares on the faith of the prospectus, and there was no reference in that to Tigre or Carstal. If Tigre was such a good mine why do the vendors ask for 30,000*l.* in cash?

The SECRETARY: That is for the machinery. It is far less than the cost.

The CHAIRMAN, after some further observations from Mr. JONES to the same effect, said the wish of the directors was to get returns from Cartago at the earliest possible time, and that would be effected by buying the Tigre property, with the machinery upon it. By this means they would be able to develope Cartago without calling up too much of the capital. This was quite apart from the great intrinsic value of the Tigre and Caratal properties.

Mr. J. A. SKERTCHLEY: The cost of a mill for Cartago will be 30,000*l.*, and the earthworks and labour will cost another 30,000*l.* The cost of working Cartago would thus be 60,000*l.* If you work Cartago in conjunction with Tigre you will for the present only have to spend 10,000*l.* That will enable you to earn dividends, and meanwhile you will be able to develope Cartago for 30,000*l.*, as you will not have to put up a mill for a considerable time. There are only something like one-eighth of the lodes at Tigre opened up, and the idea of selling the property never entered anyone's head until after Cartago was floated in London.

The CHAIRMAN: The money will come in fast enough when this Tigre affair is completed.

A SHAREHOLDER: Surely people should not have shares allotted to them without paying the deposit.

The SECRETARY: The deposit has been paid in all cases, but the board did not wish to press for the allotment money until all these calumnies about the property were at an end.——The meeting then closed.

## PANULCILLO COPPER COMPANY.

The twenty-first ordinary general meeting of shareholders was held at the Cannon-street Hotel, on Tuesday,

Mr. JOHN PENDER, M.P., in the chair.

Mr. J. S. ALEXANDER (the secretary) read the notice calling the meeting, and the report and accounts were taken as read.

The CHAIRMAN said: Gentlemen, twelve months ago, when I had the pleasure of addressing you, I gave you a very careful *résumé* of the working of the Panulcillo Mine, not only for the year to which the report referred, but also for the ten years previous; and that statement seemed to me to be so satisfactory to the shareholders generally that I am going to repeat it to-day. I simply carry on what I did then for the past year, and I do it in the belief that the more information we can give the shareholders the more is their confidence established, not only in the property, but also in the management of it. In the year 1883, 59,291 tons of copper ore were smelted by the consumption of 6844 tons of coke and 4933 tons of coal, and the production was 6645 tons of regulus, containing 3047 tons of pure copper. The amount realised for the regulus was $1,026,068, and the cost of production amounted to $855,071, and the Chili profit was thus $170,996, or, as shown in the printed statement of accounts, 32,061*l.* 17s. 1d. This profit was at the rate of about 10*l.* 10s. per ton of copper contents, or about 4*l.* 13s. per ton less than was earned in 1882. That was on account of the difference in the price of copper in the market. The principal cause of the reduction in net profits on the operations of the year 1883, as compared with the year 1882, was the difference in the value of the regulus when realised. The average English quotation for Chili bars was, in 1883, 63*l.* 10s., and in 1882, 67*l.* 9s. The regulus produced in the year 1883 realised $50,950·25 less than did the production of 1882, although the copper contents in 1883 were 123 tons greater. The difference of $50,950 from lower prices leaves only $14,572 (in 1883), attributable to higher costs, to make up $35,522, which is the difference between the profit of these two years respectively. The following is a dissection of Chili costs in 1883, which amounts, as before stated, to $855,071:—Copper ores, $423,958; fuel, $191,784; general charges, $53,057; sundries, $117,521; loss on exchange, $63,751; making the Chili costs in 1883 $855,071, or $14,572 higher than the costs of 1882, when, however, 123 tons pure copper less were made. The ores purchased in 1883 cost more than those in 1882 by $24,353; the Panulcillo ores in 1883 cost less than those in 1882 by $5241, but taking into account copper contents the ores of all kind cost about the same in the two years, an improvement in the ley of Panulcillo ores having benefited the smelting in the last six months of 1883. Taking into consideration the work done, the fuel costs in the two years were almost identical, as were also the wages costs. Now, gentlemen, I have given you the accurate figures of the cost of production, the quantity produced, the cost of ores, &c.; and, as you will see, even with the low price of copper, we are working very satisfactorily indeed. But, as copper seems to be a very fluctuating portion now in our calculations it is necessary, and we consider it necessary that the most strict investigation should take place at the mine with the view to effecting economies. And I think I cannot give you a better statement than the statement of Mr. Jones, who is our general manager, and who telegraphs on March 28, in reply to our view on economies:—"Although this matter has my careful and constant attention I have not yet thought it prudent to attempt any reduction of wages, but as men are now getting more plentiful I think before long a reduction of 10 per cent. can be made in some classes of labour, and if low copper prices continue the reduction will have to be extended gradually throughout the establishment and mines. The board may rest assured that everything shall be done to lessen the cost of production, in order to meet, as far as possible, the continuous decline of the value of copper at home." At the last meeting we stated we had sent out boring-drills with the view to the economy of labour. The economies expected from the use of rock-drills have not been fully realised. One drill only has been worked, which was started on Aug. 1. Capt. Tregay reports that it had worked smoothly, and driven about three times the speed of hand labour. He says that with very little extra cost three or even four drills will eventually be run; and then he expects the cost of driving by machinery will not exceed in any great degree that of hand labour, whilst the advantages obtained by the more rapid development of the mine will be considerable. The natives are taking more kindly to the use of the machines than they did at first. As you know, that in these distant parts with this particular class of labour it takes some time before we can get the benefit out of these mechanical improvements; but there is no doubt that when they get into the way of working them the working of the mine and the recovery of copper will not only be more expeditiously done, but also more cheaply. Our manager in Chili wrote as follows, under date Dec. 29 last:—"Matters must indeed go badly before we cease to make some profit each financial year, the only point being the sum to be earned, which must be materially affected by the state of the copper market, exchange, the ley of the ores, &c.; but considering the advantages reasonably to be expected from the new machinery now in use, and the improved financial position of the company, it is not too sanguine to hope that we may at least do as well in the future as we have done since 1874, and so derive an annual Chili profit. Now, when you review, as I did last year, the progress of the mine during that period, if we continue to do as well in the future, I shall be well satisfied; but if we can do as well now, with copper at the price which it has realised during the past few years what can we do if we can get an advance in the price of copper? I have lived long enough to see that these things work in cycles, and unless there is something different in copper to what there is in other things there must be an improvement in price. Statistics show a diminution of stocks and afloat, which figure on the 15th inst. at 31,142 tons, which was 5500 tons of copper lower than the average of the past eight years. That shows, at all events, the demand is keeping pace with it if not ahead of the supply; and I believe that were it not for the general stagnation which exists, not only in one trade, but every trade, arising, I believe, in some cases, from political causes—were if not for that I I believe that copper is one of the first things which must attract attention when confidence can be restored in commercial ventures. Now, gentlemen, I have given you some facts which will be interesting to you, but there is one point which I must give you my opinion upon, and not only my opinion, but the opinion of all experts in the working of Chili Mines, and that is, that the deeper you go the better and richer will be the class of ores, and the more plentiful. Now, it so happens, that at Panulcillo we have literally scratched ore on the top; we have not gone down to any depth worth mentioning. So the future of this mine is a very promising one indeed, and if we are to judge of our mines by other mines which have been worked in Chili, where they have gone down so improved their ley, I think the prospects of our own mine in that direction are very satisfactory indeed. We have always talked at these meetings of the Panulcillo Mine being more like a quarry than anything else connected with mining, and we see no reason to change our opinion in that respect; and looking to that, and looking now to the advantages which we are going to derive from the rock-drill, and that we are improving our mine at greater depth, I think we may feel satisfied at the present time that Panulcillo stands in probably as favourable a position as any mine known to us at the present time. We are not dependent upon the rich class of ores, because we are working a very poor class of ore, and all the tendency is in the direction of a better class of ore; and I say, looking at the low price of copper, and that the tendency is to a better price of copper—since I last had the pleasure of seeing you copper went down considerably, but it rose in a few days to 2*l.* and 3*l.* per ton, but it has gone back from that but not to the lowest point. I think with a restoration of confidence, which I hope will come at an early date, and a good harvest will have a considerable influence—when the good times come we are likely to share, in a very considerable degree, the improved prospects of trade generally. There is one point I wish to refer to. The Panulcilo Mine, as you are aware, is connected with the coast by a railway, which was made some years ago, and no doubt this is a very great advantage to the company. But the railway without the Panulcilo would be worthless. It is the Panulcillo traffic which makes the railway at all a paying concern. We have had some reason lately to rather complain against the railway, and we have even been talking of putting down a tramway so as to do without the railway, supposing we cannot get the railway to act fairly and justly to us; but we think it much better that we should work in harmony with the railway. But what we are doing at the present time is this—and I am rather anxious to have an expression of opinion from my shareholders on the subject, because it will be probably encouraging us to pursue a bolder policy with the railway, for I believe that we could safely venture to make ourselves perfectly independent of the railway. What they do is this; there are a great many ores found in the neighbourhood of Panulcilo, which we buy for the purpose of mixing and smelting of their own ores. The railway is giving certain facilities to the men who find the ores to carry those ores over the railway away from us, and selling them to smelters in other directions. When I tell you that if those ores were smelted at Panulcillo, and if you take into account the coal and coke which is required to smelt them at the end of the year—if we smelted all these ores the railway company would have a very considerably larger amount in their exchequer than they had by taking the ores away from us, causing us inconvenience and our often having to pay a higher price. In other words the railway is the cause of very considerable competition with us in the purchased ores. I think the thing is so plain that to the letter which we have addressed to the Chairman of the railway company we shall have such a response as will probably enable me, when I next address you, to assure you that the question has been settled in a way which will be satisfactory to Panulcillo. I think I have given you all the information that I can give you with respect to this mine. I have never changed my opinion regarding it, not even during the hard and difficult times which we had some years ago. We have had a cycle of bad times, and I hope we have now entered upon a cycle of good times. The difference in the value of copper will account at once to you for what I am now going to announce, which is that the dividend for the year will be 12½ per cent. instead of 15 per cent., as last year. It would have probably been less had everything been taken into account, but looking at the low price of copper we have no reason to be dissatisfied with this dividend of 12½ per cent., seeing that we carry forward nearly 3500*l.* to next account. I hope gentlemen who have followed this mine all through will say, looking to the change in the value of the ore we have to deal with, that 12½ per cent. is rather an encouraging dividend. In conclusion, the Chairman moved the adoption of the report and accounts, and the declaration of a dividend of 2s. per share on the shares of the company, making a total distribution of 10s. per share for the year 1883, being at the rate of 12½ per cent. per annum.——Mr. F. J. JOHNSTON (the deputy-Chairman) seconded the motion.

Mr. EVERETT (of Birmingham) expressed his satisfaction with the report, but said that he did not quite take the cheerful view which the Chairman did regarding the future of the copper market, though at the same time he did not think copper would go lower. He asked whether the directors were paid by a percentage on the profits?

The CHAIRMAN said they were, and he might mention that for many years the directors worked without any remuneration whatever.

The Right Hon. CAVENDISH BENTINCK, M.P., asked whether the directors were fully satisfied that the 12½ per cent. was fully earned, seeing that a somewhat less amount was carried forward than was brought into the accounts. As regarded the ore being richer in depth, he asked whether that opinion was founded on the experience of this company, or the experience of other mines in the district? He did not quite agree with the Chairman regarding the better future of copper, for he thought the large return of foreign copper on the English market would tend to keep down the price.

The CHAIRMAN said that as regarded the price of copper he was not going to prophecy what the future price would be; but seeing the large number of new undertakings, especially electric lighting, in which copper must be very largely employed, he thought the outlook was more encouraging than Mr. Everett seemed to think. He was not going to say that the supply might not be equal to the demand; but it was a remarkable fact, as he had shown, that the supply was not in excess of the demand, as compared with previous years. Therefore, seeing the large number of industries in which copper was employed, if a start took place he was very hopeful about the future. As regarded the question of Mr. Cavendish Bentinck, that gentleman might rest satisfied that the 12½ per cent. was amply and honestly earned and about 600*l.* more, and in addition they had paid off about 10,000*l.* of debentures, and when all the debentures were out of the way there would be so much the more for the shareholders. As regarded the richness of the mine, the experience at Panulcillo was that the deeper it went the richer it became. A telegram received yesterday stated—"The new shaft is now down 11 metres below the 90 level. Good progress in sinking is now being made, and the ground maintains highly encouraging prospects of making ore in depth. The air-compressing engine was got to work on the 2nd inst., and the rock-drills resumed oprations in the 60 and 90." The telegram went on to state that the indications were encouraging. In reply to a further question by a SHAREHOLDER, the CHAIRMAN said that Mr. Jones had written—"Considering the advantages reasonably to be expected from the new machinery now in use, and the improved financial position of the company, it is not being too sanguine to hope that we may at least do as well in the future as we have done since 1874." Since 1874 they had paid off 60,000*l.* of debentures, 60,000*l.* of debts, and also paid handsome dividends, and, therefore, he thought that if they did as well in future as in the past the shareholders might well be satisfied.

The resolution for the adoption of the report and accounts was then put and carried.

The CHAIRMAN moved the re-election of Mr. F. J. Johnston as a director.——Mr. A. H. BERTHOUD seconded the motion, which was carried.

On the motion of Mr. F. WALTERS BOND, seconded by Sir W. J. W. BAYNES, Bart., Mr. John Denison Pender was re-elected.

On the motion of the Right Hon. CAVENDISH BENTINCK, the auditors, Messrs. Harding, Whinney, and Co., were re-elected.

On the motion of Mr. WM. FORD, seconded by Mr. EVERETT, a cordial vote of thanks was passed to the Chairman and directors.

Mr. WM. FORD moved a vote of thanks to the staff abroad and at home, which was seconded by Mr. EVERETT.

The CHAIRMAN said that the board cordially joined in the vote.

The motion was carried, and the meeting broke up.

## VANCOUVER COAL MINING AND LAND COMPANY.

The annual general meeting of shareholders was held at the offices of the company, Old Jewry Chambers, on Tuesday,

Mr. JOHN GALSWORTHY in the chair.

Mr. JOSEPH RAMSDEN (the secretary) read the notice convening the meeting. The report and accounts were taken as read.

The CHAIRMAN said: You will have seen from the report, gentlemen, that we are still in the difficulty of not making a profit, and I have no doubt you are not surprised at that, after what has been said to you at the recent meetings we have had, at which I have explained fully the position of the company, and the fact of those meetings having been held will render it unnecessary that I should go at any great length into that position. You will have seen that we have to debit our account this year with somewhere about 9000*l.* for the year. That debit you will see is made up not only of our loss, but also of those various funds which we have set up for our protection—the insurance fund has taken 220*l.*; the land sales reserve, 2369*l.*; and the depreciation has been written off at about the usual rate, or not quite so much as formerly, 2462*l.* These items have all added to what we call the debit of profit and loss. The actual loss on the colliery was not very material, and the whole position has been produced, as you will have seen from the report, mainly by the small output in the first half of the year. In that half the output was only 5000 tons, and in those six months the loss was, of course, the biggest. In the second half the output was 17,000 tons, and the loss then was about half as much as in the first six months; so that you see the position has been brought about by the bad output which we encountered up to the end of the year. We are now, of course, in a better position in that respect, and the recent telegrams have shown us that we are getting an output of between 400 and 500 tons a day. To-day's telegram is not quite so favourable as that of last week; but it gives an output of 410 tons at the three mines. Now, even that output—when we get down to our normal position which we shall be in in a month or two, when we shall have got rid of the extra outlay upon our mines, will give us a very good income; but we hope to get a better output than that. You all know that Mr. Robins' estimate goes greatly beyond that, and I hope we shall have the good fortune of realising the output he estimated. You will have seen by the report, too, that we have purchased another property—the Harwood estate. That has been before us for many years, and we had not thought it worth while to embark in it, and even now we have bought it somewhat as a sentimental purchase; that is to say, we do not want it at the moment, but inasmuch as a new railway has been decided upon, and inasmuch as it joins our estate immediately at the back, as you will see by the plan, making the estate instead of one of 7000 acres, one of 16,000 acres we have thought it better to purchase it. It will give us a compact estate of 16,000 acres; and when I tell you that there are some advantages attending this purchase in regard to what we propose to do as to the wharf and extending our means of getting rid of our coal, and when I tell you that there is a very large quantity of fine timber on the estate, and every probability, as far as we can judge, of the coal which prevails in our own estate underlying that estate also, I think the shareholders will concur in the operation which the directors have thought themselves right in encountering—the purchase of this estate, especially when we tell you that we have bought it on reasonable terms. So far as the purchase is concerned we get 9000 acres for 12,000*l.*, and the money has been paid principally in the debentures with only a small amount of cash.

Mr. C. S. HILL: Has it been a colliery in operation at all?——The CHAIRMAN: No. It has been explored slightly, and there is coal there, but it is not a coal property in the strict sense of the word. We have reason to believe, however, that underneath that property also lie the seams which we are now working. Then you will have observed also that the operation which we entered upon of issuing new shares for the purpose of helping to pay for the new works we have embarked in in this company has been successful, and that the new shares have been all taken up and paid for, and I dare say if we had wanted more money we should have been able to get it in that way. We consider that a most satisfactory way of obtaining the money, because it enlarged the interests of the shareholders in the undertaking, and it enlarged the interest of our agent in San Francisco, who has taken a considerable number of shares—which is, I consider, a very satisfactory feature in the matter. As to the progress of the mine this year, up to the end of April the sales have been about 30,000, while the output has been about 40,000 tons up to this time. We have eight months more left, and I should think at the present rate we should expect to go beyond 100,000 tons in the course of the year—that is, very safely speaking; but we do hope to do a good deal more, and as I tell you, if we accomplish that, we shall certainly at the end of the year be able to present to you a better state of things than we are able to do to-day. The price has been fairly good. I see that the sales last year averaged $3·25 at the mine; this year the price has averaged $3·6. The price, therefore, has been rather good, and our agent tells us that he could sell a good deal more coal if he had it; so that upon the whole I think matters are looking well. Mr. Robins arrived at Nanaimo on May 10, and is now no doubt settling down. We have not yet heard from him, but the next letter will no doubt give a full account of his progress, and I must congratulate the shareholders upon the fact of Mr. Robins' appointment, and I must say that if the company is ever to succeed then that by the present arrangement of its machinery—that is to say, with Mr. Robins there, and the directors here determined to do all they can to further its interests, and the efficient and economic way in which, I may say, the whole thing is now being conducted—it has now a chance, and I believe that with ordinary good fortune you will see this company very flourishing. I do not think there is any other matter to refer to, but I shall be happy to answer any questions which the shareholders may think proper to ask. I now beg to move—"That the report and accounts for the year ending Dec. 31, 1883, now before the meeting, be received and adopted."——Mr. JOSEPH FRY seconded the motion.

Mr. HILL: The fluctuations in the output are not a matter for surprise; but can you tell us where the fluctuations have happened principally?——The CHAIRMAN: Principally I think in No. 1 shaft.

The motion was put, and carried unanimously.

Mr. ROBERTS moved the re-election of the retiring directors—Messrs. William Needham and Frederick Tendron.——Mr. PHILLIPS seconded the motion, which was carried.

Mr. F. TENDRON, in returning thanks for his re-election, said I should like to give you a little positive information as to the month of March, the accounts of which have come over, so that that month is out of the domain of expectation, and is one of positive fact. One of the large collieries to be opened was the South Field Colliery. A larger one will be the East Field; but at the South Field they have an adit, a slant, and another adit being driven into the coal, and that will increase the output to at least 400 tons a day. The output from the South Field Colliery at present is 220 tons a day. When they get coal in all the different drivings it is 300 tons at present, but when they meet with a fault or have soft ground or other causes of interruption it is only 220 tons a day. For March the output was 4700 tons, and the price realised was something like $17,000. The expenses in that field including every charge, such as the driving of the slant and the adits and the exploration of the bar, was under $16,000; so that with every disadvantage and before anything like the full amount of coal is obtained from the field there is an actual profit, and there is a very clear indication of what we are likely to get when something like the full output is obtained from the East Field, Douglas, and South Field. You may look upon this as a new enterprise. I may say too that San Francisco can take 250,000 to 300,000 tons of coal a year without materially altering prices. There are several new shareholders here who took the new shares, and I certainly think that anybody who advised them to do so has done them a good turn. If we have patience for another 12 months I do not think we shall have any reason to be dissatisfied.

Mr. NEEDHAM also returned thanks, and said they were likely to suffer far less from the competition of English coal in future.

Messrs. Hill and Lovelock were reappointed auditors.

The meeting then closed with a vote of thanks to the Chairman and directors.

[For remainder of Meetings see this day's Journal.

CLEMENTINA LEAD MINE COMPANY—GWYDYR AMALGAMATED MINES COMPANY.—At meetings on Thursday Mr. C. B. Parry, the liquidator, presented accounts and reports to date, and resigned the office. Mr. B. Ashmead was appointed in his stead

## FOREIGN MINING AND METALLURGY.

There has not been much change in the general tone of the French iron trade. The anomaly must still be noted that while forgemasters in the Nord are maintaining the price of iron at 6*l.* 4s. per ton, merchants at Paris are selling the same product upon that market at the same price. It is still a mystery how this can be done, as little or no merchants' iron is produced in the neighbourhood of Paris, and the merchants' iron sold at Paris must, accordingly, really come from the Nord. Contracts for armour-plates to the value of 80,000*l.* or 120,000*l.* are about to be given to the French steelworks, to say nothing of orders for cannon. The French Transatlantic Company has also given out orders for some iron and steel boilers. Two steel boilers are to be built at St. Nazaire, and St. Etienne will furnish the works of the Leyne with the iron plates required for the construction of two other boilers. A contract for 9000 tons of rails, taken by Terrenoire for Algeria, has been passed on to Bessages, where the conditions of production are stated to be a little more favourable. The imports of iron minerals into France in the first four months of this year amounted to 454,595 tons, as compared with 520,978 tons in the corresponding period of 1883, and 430,262 tons in the corresponding period of 1882. The total of 434,595 tons, representing the imports to April 30 this year, was made up as follows:—Belgium, 60,566 tons; Germany, 131,140 tons; Spain, 162,495 tons; Italy, 23,860 tons; Algeria, 69,213 tons; and other countries, 7321 tons.

The condition of the Belgian Iron Trade has not materially changed. No improvement is observable in affairs, although, on the other hand, there has been no decidedly adverse movement. Orders have become scarce, and are secured with difficulty, so that many establishments consider themselves fortunate if they have a fortnight's work in advance. Upon the whole, the situation must still be pronounced precarious. English casting pig No. 3 has made 2*l.* 3s. 6d. per ton upon the Belgian markets. Refining pig hard iron has brought 2*l.* 0s. 10d. per ton; ordinary ditto, 1*l.* 16s. 10d. per ton; and mixed ditto, 1*l.* 12s. 10d. per ton. The quotation for No. 1 iron has been 4*l.* 12s. per ton; for No. 2 ditto, 4*l.* 18s. per ton; and for No. 3 ditto, 5*l.* 4s. per ton. Girders have been quoted from 4*l.* 16s. to 5*l.* per ton. No. 2 plates have made 6*l.* 4s. per ton; No. 3 ditto, 7*l.* per ton; and plates of commerce, 8*l.* 12s. per ton. The German iron trade has not shown any important change during the week which has just elapsed. Pig has continued in average demand; at any rate, the proprietors of blast-furnaces have no apprehensions of remaining without work, although the stock of orders on hand is far from being so large as could be desired. Iron has been scarcely so well supported as it was a week since, and the proprietors of German rolling-mills complain that orders are becoming scarcer. Plates continue, however, to meet with a ready sale, and the steelworks are moving on well, while they are assured employment for some time to come.

Contracts for coal, which are about to be let by the Administration of the Belgian State Railways, will enable a more definite opinion to be formed with respect to the condition of the Belgian coal trade. It is expected that the pending contracts will be taken at very low rates. Coke has been in comparatively little request upon the Belgian markets; the general quotation is 10s. 5d. per ton. The condition of the German coal markets has scarcely changed. Both household and industrial coal have been in comparatively little request, but gas coal has been disposed of tolerably readily. The Administration of the German State lines has recently let contracts at Cologne for the delivery of 140,000 tons of locomotive coal, 1000 tons of forge coal, and 5400 tons of gas coal. The locomotive coal was taken at 5s. to 5s. 7d. per ton, the forge coal at 5s. 5d. per ton, and the gas coal at 5s. 10d. per ton. We learn that the Russian Government has approved the policy of the Russian Tariff Commission in imposing a duty of 1½ copecks per pood upon coal imported into Russia from the West of Europe *via* the ports of the Black Sea and the Sea of Azoff. Coal will continue, however, to be imported free of duty *via* Archangel and the Baltic ports. The new regulation will come into force Jan. 1, 1885. The Herve-Wergifosse Collieries Company (Belgium) has just reported progress. The working of the year resulted in a profit of 1044*l.*, but of this amount 570*l.* was brought forward from the preceding financial year, so that the profit realised by the company in 1883 was only 474*l.* A dividend of 8s. per share is recommended for 1883.

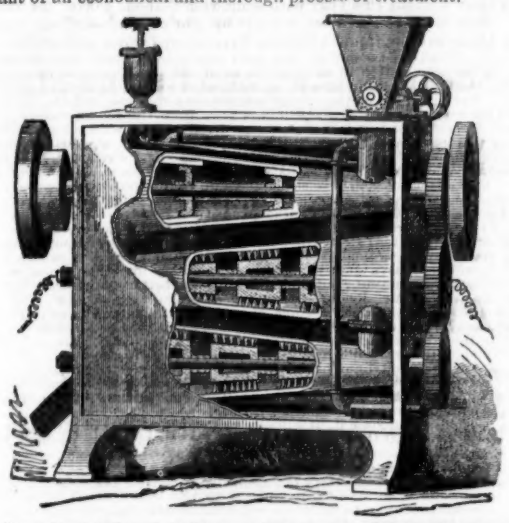
CORNISH PUMPING-ENGINES.—The number of pumping-engines reported for April is 13. They have consumed 1705 tons of coal and lifted 12·5 million tons of water 10 fms. high. The average duty of the whole is, therefore, 49,400,000 lbs. lifted 1 ft. high by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

| | | |
|---|---|---|
| Carn Brea—76 in. | Millions | 49·5 |
| Dolcoath—85 in. | | 60·8 |
| Mellanear—76 in. | | 56·9 |
| West Basset—Thomas's 60 in | | 50·0 |
| West Wheal Seton—Harvey's 85 in. | | 64·7 |
| West Wheal Seton—Rule's 70 in. | | 57·9 |


## NOVEL ELECTRO METALLURGICAL MACHINE.

PROFESSOR JAMES MANES AND SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings of stamp mills, or the sands of hydraulic gold diggings, or from the black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-milling gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle for want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which it is claimed will save nearly the entire amount of mineral which passes through it, the loss not being over 10 per cent., and in many cases not in excess of half that amount. The machine is a cheap and practical process—it never need stop for charging or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ores, or refractory after roasting. It consists of a series of three or more large cylinders, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each.

The ore and mercury are fed into the first cylinder, passing into the second, and then to the third. The first cylinder is furnished with steel mullers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed; through this a current of electricity is furnished by a Westinghouse dynamic electro machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to incline copper plates, the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel, and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are—

1.—The saving of almost all the mineral passing through the machine.

2.—The loss being less than 10 per cent.

3.—The entire absence of loss of the amalgamated material, thereby saving all the mercury, which, with the processes now in use, there is a large loss both of mercury and the precious metal.

4.—The small cost per ton at which the ore can be treated.

By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained, which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California by paying for the building of the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to those desiring any of their patent machines or revolving furnaces for roasting or smelting ores, ball pulverisers, &c.

Prof. James Manes and Sons are agents for the Morey and Sparey Ball Pulveriser, that crushes and pulverises at the same time, and does as much work as eight stamps in a day, crushing either wet or dry.

PRINCIPAL OFFICE OF

**Prof. MANES and SONS,**

**No. 372, Glanarm Street, Denver, Colorado, U.S.A.**

All our machines and furnaces are made by the Colorado Iron Company of Denver, Colorado, the most extensive mining machine works in America.

PHILLIPS MONTHLY MACHINERY REGISTER.—THE BEST MEDIUM IN THE KINGDOM FOR THE PURCHASE OR SALE OF NEW OR SECONDHAND MACHINERY.

Subscription, 4s. per annum, post free.

PUBLISHER AND PROPRIETOR, CHARLES D. PHILLIPS, NEWPORT MON.

THE

## BALL GOLD MINING SYNDICATES.

9, BUSH LANE, CANNON STREET, LONDON, E.C.

Participators wanted in Two Gold Mining Ventures—C and D—on the New System of Investment, and of working the properties.

Amounts required ..... £700 for C
In £50 or multiples thereof .... 350 for D

THE REMAINDER OF CAPITAL ALREADY IN HAND.

Returns in seven months in C.
Returns in three months in D.

No Purchase of Property—no Promotion Money—no Patent Charges—the whole Money Subscribed applied to work the Properties.

These Syndicates being private and arranged between a few gentlemen information will be given only on personal application or by correspondence.

SUBSCRIPTION NOW OPEN.

Apply by letter first, or personally at above address, Mondays, Tuesdays, and Fridays, 11 to 1 P.M.

Just published, price 7s. 6d., post free.

TABLES FOR ASCERTAINING THE PRICE OF TIN ORE AT A GIVEN STANDARD AND PRODUCE:

To which is added Tables for Ascertaining the Value of any Quantity of Black Tin, from 1 lb. to 10 tons, at any price from £20 to £100 per ton.

Originally compiled and calculated by the late Mr. R. WELLINGTON; and now extended, reprinted by Mr. W. BAILEY, of Camborne, and carefully verified throughout.

London: MINING JOURNAL Office, 26, Fleet-street, E.C.; and may be had by order of all Booksellers.

Australia: GEORGE ROBERTSON, Melbourne, Sydney, Adelaide, and Brisbanne.

Just published.

THE NORTH WALES COAL FIELDS

Being a series of Diagrams showing the Depth, Thickness, and Local Names of the Seams in the principal Collieries of the various districts, with Index, Geological Map, and horizontal sections across the Ruabon, Brymbo, Buckley, and Mostyn districts.

By JOHN BATES GREGORY and JESSE PRICE, of Hope Station, near Mold, Flintshire.

Price: Mounted on holland, coloured and varnished, and fixed on mahogany rollers, 30s. each; or in book form, 12 x 9, mounted and coloured, 25s. each

May be obtained, by order, of all Booksellers, or direct from the MINING JOURNAL Office, 26, Fleet-street, London, E.C., upon remittance of Post Office Order for the amount.

THE COLLIERY READY-RECKONER AND WAGES CALCULATOR.

By JAMES IRELAND

"Will be the means of preventing many disputes between pay clerks and colliers."—*Mining Journal.*

To be had on application at the MINING JOURNAL Office, 26, Fleet-street, E.C

THE IRON AND COAL TRADES REVIEW

The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matters relating to the Iron Coal, Hardware, Engineering, and Metal Trades in general

Offices of the Review: 342, Strand, W.C.

Remittances payable to W. T. Pringle.

FROISETH'S NEW AND REVISED MAP FOR 1875,—Size 40 by 56 inches, scale 8 miles to the inch. Handsomely engraved, coloured in counties, showing the Towns, Settlements, Rivers, Lakes, Railroads Mining Districts, &c., throughout the Territory, and all the Government Survey to date. Mounted on cloth, £2; half-mounted, £1 12s.; pocket form, £1.

Also, GENERAL MINING MAP OF UTAH, showing twenty-eight of the principal Mining Districts adjacent to Salt Lake City, and location of the most prominent mines. Price, pocket form, 6s.

Also, NEW MAP OF LITTLE AND BIG COTTONWOOD MINING DISTRICTS showing the location of over Four Hundred Mines and Tunnel Sites, together with the Mines Surveyed for United States Patent. Price, sheets, 6s.; pocket form, 8s.

For sale, and supplied by—

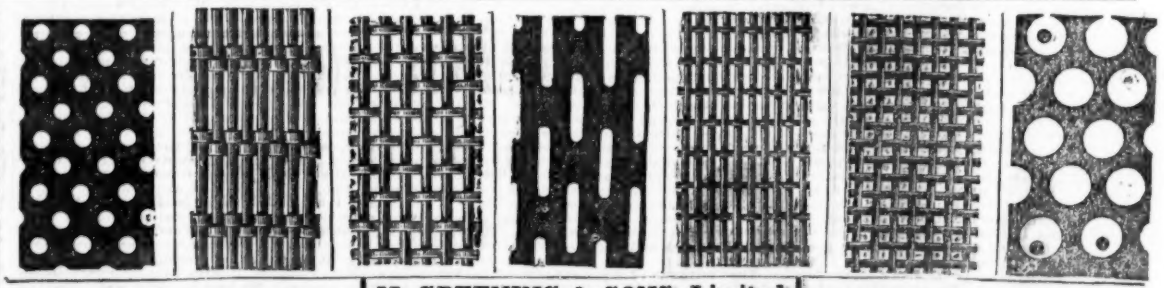
TRUBNER and Co., 57 and 59 Ludgate Hill, London.
B. A. M. FROISETH, Salt Lake City, Utah, U.S.

SMALL ENOUGH TO CARRY IN THE POCKET ANEROID CASE.

PRACTICAL HYPSOMETRY: A Method of DETERMINING ALTITUDES (Heights of Mountains and Depths of Mines) accurately and almost instantaneously, with the Aneroid Barometer, WITHOUT TABLES.

Price One Shilling, post free.

London: MINING JOURNAL Office, 26, Fleet-street, E.C



Extra Treble Strong Wire Cloth and Perforated Metals in Steel, Iron, Copper, Brass, Zinc, Bronze.

Made in all Meshes and Widths.

**N. GREENING & SONS, Limited,**

Wire Manufacturers and Metal Perforators,

**WARRINGTON.**

Jigger Bottoms, Trommels, Cylinder Covers, Riddles, Sieves for Diamond, Gold, Silver, Copper, Lead and Tin Mines.

Samples and Prices free on application.

# SAMUEL OSBORN AND CO.,

MANUFACTURERS OF TOUGHENED

# CRUCIBLE STEEL CASTINGS

**Of all descriptions of special strength and solidity.**

ALSO, MANUFACTURERS OF

BEST CAST STEEL FOR ENGINEERS AND MINERS' PURPOSES; FILES; SAWS; HAMMERS; RAILWAY SPRINGS, &c.

STEEL SHEETS AND FORGINGS.

SOLE MAKERS OF

R. MUSHET'S CELEBRATED EXTRA BEST

# TITANIC CAST STEEL FOR BORERS,

**And of R. Mushet's pecial Steel for Lathe and Planing Tools and Drills,**

THE STEEL WHICH REQUIRES NO HARDENING.

# CLYDE STEEL AND IRON WORKS, SHEFFIELD.

# MINING MACHINERY,
# MILLING MACHINERY

**Of the MOST APPROVED AMERICAN PATTERNS.**

**GOLD MILLS.**

The California pattern of Gold Stamp Mill is universally accepted as the most perfect, economic, and efficient made.

We have over 900 stamps in successful work in the various Western Gold Districts.

**SILVER MILLS.**

Silver amalgamation in Pans is essentially an American system evolved after years of work on the rich silver mines of Nevada.

We have over 500 Stamps, with necessary pans, settlers, roasting furnaces, &c., all of our own manufacture, at work in different silver camps of the United States, Mexico, and South America, and Phillipine Islands, Asia.

**CONCENTRATION MILLS**

Of the most approved German pattern and arrangement, or with Stamps and Frue Vanner Concentrators for low grade silver ores, light in lead. We have over 20 large German pattern mills at work on lead, zinc, or copper ores, and numerous Vanner mills on ores never before successfully concentrated.

**Mining Pumps,** Cornish pattern, of the largest sizes. **Hoisting Engines,** from 4 h.p. up to the largest direct-acting engines to sink 3000 feet.

**SMELTING WORKS.**

We have 80 Water Jacket Smelting Furnaces in use from 20 in. circular up to 54 in. by 60 in. for lead and silver smelting; and special High Jacket Furnaces for copper ores.

**Engines** of any size, plain slide valve, Corliss, compound Corliss, Boilers, all sizes. **Leaching Mills, Hallidie Wire Rope Tramways. Comet Crusher,** with capacity of 12 to 20 tons per hour. **White, Howell. Bruckner, and Stetefeldt Roasting Furnaces, &c.**

We have had twenty years' experience in the manufacture solely of MINING MACHINERY, and have special facilities for shipping to all foreign parts through our New York Office, where all details of clearance, shipment, and insurance are conducted. Our machinery is already well known in Mexico, Peru, Chili, Venezuela, Honduras, and other South American countries.

*Correspondence solicited. Descriptive Circulars and Catalogues on application.*

## FRASER AND CHALMERS.

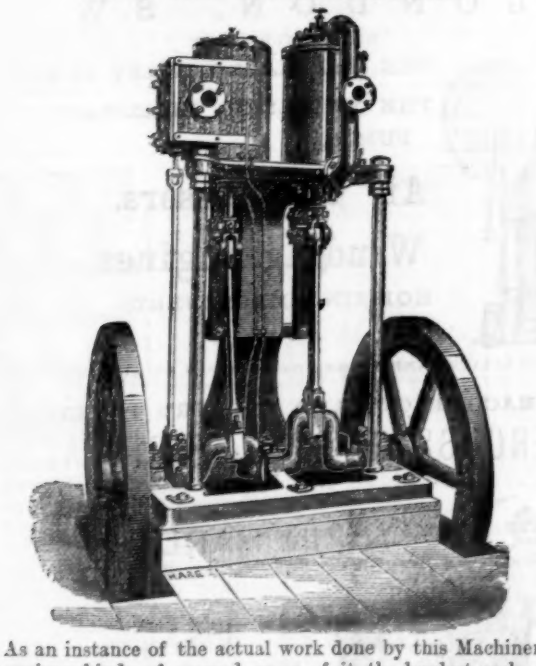
| PRINCIPAL OFFICE AND WORKS. | NEW YORK OFFICE. |
|---|---|
| Fulton and Union Streets, Chicago, Ill, U.S. | No. 2, Wall Street, New York, U.S. |

COLORADO OFFICE—CHEESMAN BLOCK, DENVER.

---

THE

# "Champion" Rock-borer
## AND AIR COMPRESSOR.



As an instance of the actual work done by this Machinery in various kinds of ground, some of it the hardest rock, it may be mentioned that in Cornwall, irrespective of the work performed by the "Champion" Rock-borers and Air-compressors purchased by various Mines, the drivage, rising, sinking, and stoping done by contract by the Proprietor with his own Machinery now amounts to over 1150 fathoms.

Several of these Air-compressors, ranging from 3½ to 12 tons in weight may be seen in constant work in the Camborne Mining District.

## R. H. HARRIS,

ENGINEER,

63, QUEEN VICTORIA STREET, LONDON.

---

KIRKSTALL, BOWLING, AND STAFFORDSHIRE BAR IRON

**RAILS—RAILS—RAILS—**

New, slightly defective.

F.B. SECTION—BULL HEAD—DOUBLE HEAD—
10, 12, 14, 16, 18, 20, 24, 30, 40, 50, 60, 70, 75, 80 lb. per yard.
Sections on application to

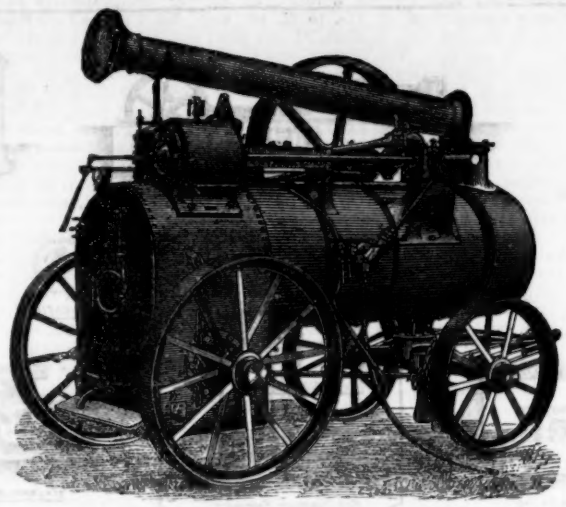
WILLIAM FIRTH, WATER LANE, LEEDS.

POINT and CROSSINGS with all Fittings complete.
2000 tons in stock ready for delivery.

---

# CLAYTON AND SHUTTLEWORTH,
## STAMP END WORKS, LINCOLN, AND 78, LOMBARD STREET, LONDON.

☞ *The Royal Agricultural Society of England have awarded Every First Prize to CLAYTON and SHUTTLEWORTH for Portable and other Steam Engines since 1863, and Prizes at every Meeting at which they have competed since 1849.*



**Steam Engines, portable & fixed,**
For Coals, Wood, Straw, and every kind of Fuel.
OVER 21,500 SOLD.

**Thrashing Machines.**
OVER 19,500 SOLD.

**Straw, Corn, and Hay Elevators.**
**Chaff Cutters for Steam Power.**
**Grinding Mills.**
**Saw Benches.**
**Traction Engines, &c.**

GOLD MEDAL AND FIRST CLASS CERTIFICATE at the Calcutta International Exhibition 1883-4.
THE ONLY GOLD MEDAL
AWARDED FOR
PORTABLE STEAM ENGINES.

GOLD MEDALS AND OTHER PRIZES have been awarded to CLAYTON AND SHUTTLEWORTH at all the important International and Colonial Exhibitions, including
LONDON, 1851 and 1862;
PARIS, 1855, 1867, and 1878;
VIENNA, 1857, 1866, and 1873.

**Catalogues in English and all European Languages free on application.**

---

# THOMAS TURTON AND SONS,

MANUFACTURERS OF

**Cast Steel for Mining and other Tools, Shear, Blister, and Spring Steel.**

FILES OF SUPERIOR QUALITY.

EDGE TOOLS, HAMMERS, PICKS, AND ALL KINDS OF TOOLS FOR RAILWAYS, COLLIERIES, ENGINEERS, AND CONTRACTORS LOCOMOTIVE ENGINE, RAILWAY CARRIAGE, AND WAGON SPRINGS AND BUFFERS.

## SHEAF WORKS, AND SPRING WORKS, SHEFFIELD.

LONDON OFFICES:—90, CANNON STREET, E.C.

---

# POTENTITE.

This unrivalled Explosive, as manufactured by the **New and Perfected Machinery** of the Company, is perfectly safe for transit, storage, and use, and is employed in every description of Mining or Quarrying Work, for Tunnelling, Pit Sinking, Engineering Work, and Submarine Operations, with the most complete success and satisfaction.

**Potentite** does NOT contain its own MEANS OF IGNITION, is free from Nitro-Glycerine, and its SAFETY has been speciall demonstrated by public experiments.

Its strength is unequalled. Its action is certain.

In action it gives off neither flame, smoke, nor offensive smell. By its use labour is economised, as work can be resumed immediately after the shot is fired.

POTENTITE is specially adapted for export to hot climates, as it is unaffected by heat, and is free from dangerous exudations.

POTENTITE IS THE SAFEST STRONGEST, AND WORK FOR WORK, CHEAPEST EXPLOSIVE IN THE MARKET.

For particulars and prices, apply to—

## THE POTENTITE COMPANY. LIMITED.

HEAD OFFICE—S. FENCHURCH AVENUE, LONDON. E.C.

---

# FRANCIS MORTON AND CO., LIMITED, LIVERPOOL,

MANUFACTURERS OF

## GALVANISED CORRUGATED IRON ROOFS, BUILDINGS, AND SHEDDING,

WHICH THEY HAVE EXTENSIVELY ERECTED FOR THE REQUIREMENTS OF

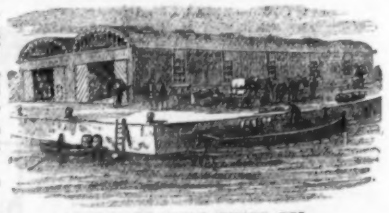
**Forges, Rolling Mills, Puddling Sheds, Ironworks, and Collieries**

**Erected Complete in this Country, or prepared to Plan for Erection Abroad.**

OPEN SHED FOR COVERING LARGE AREAS

GALVANISED OR PAINTED CORRUGATED IRON ROOFING PLATES and TILES. HEAVY CORRUGATED IRON PLATES for fireproof floors, roadways, parapets, &c. (for producing which F. M and Co. have recently laid down powerful Hydraulic Machinery). Wrought-iron Tanks, Guttering, and General Constructional Wrought Ironwork.

DESIGNS PREPARED, AND ILLUSTRATED DESCRIPTIVE CATALOGUES FORWARDED ON APPLICATION

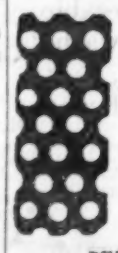


GENERAL STORE FOR WHARF, ETC.

**London Office: 9, Victoria Chambers, Victoria Street), Westminster, S.W.**
(Rooms Nos. 27 and 28, on the First Floor.)

---

# MANCHESTER WIRE WORKS.



NEAR VICTORIA STATION, MANCHESTER.
(ESTABLISHED 1790).

## JOHN STANIAR AND CO.,

Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper.

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

PERFORATED IRON, STEEL, COPPER, AND ZINC PLATES IN VARIOUS DIMENSIONS AND THICKNESSES.
*Shipping Orders Executed with the Greatest Dispatch*

---

# DYNAMITE, GUN-COTTON, AND PATENT ELECTRIC FUSES,

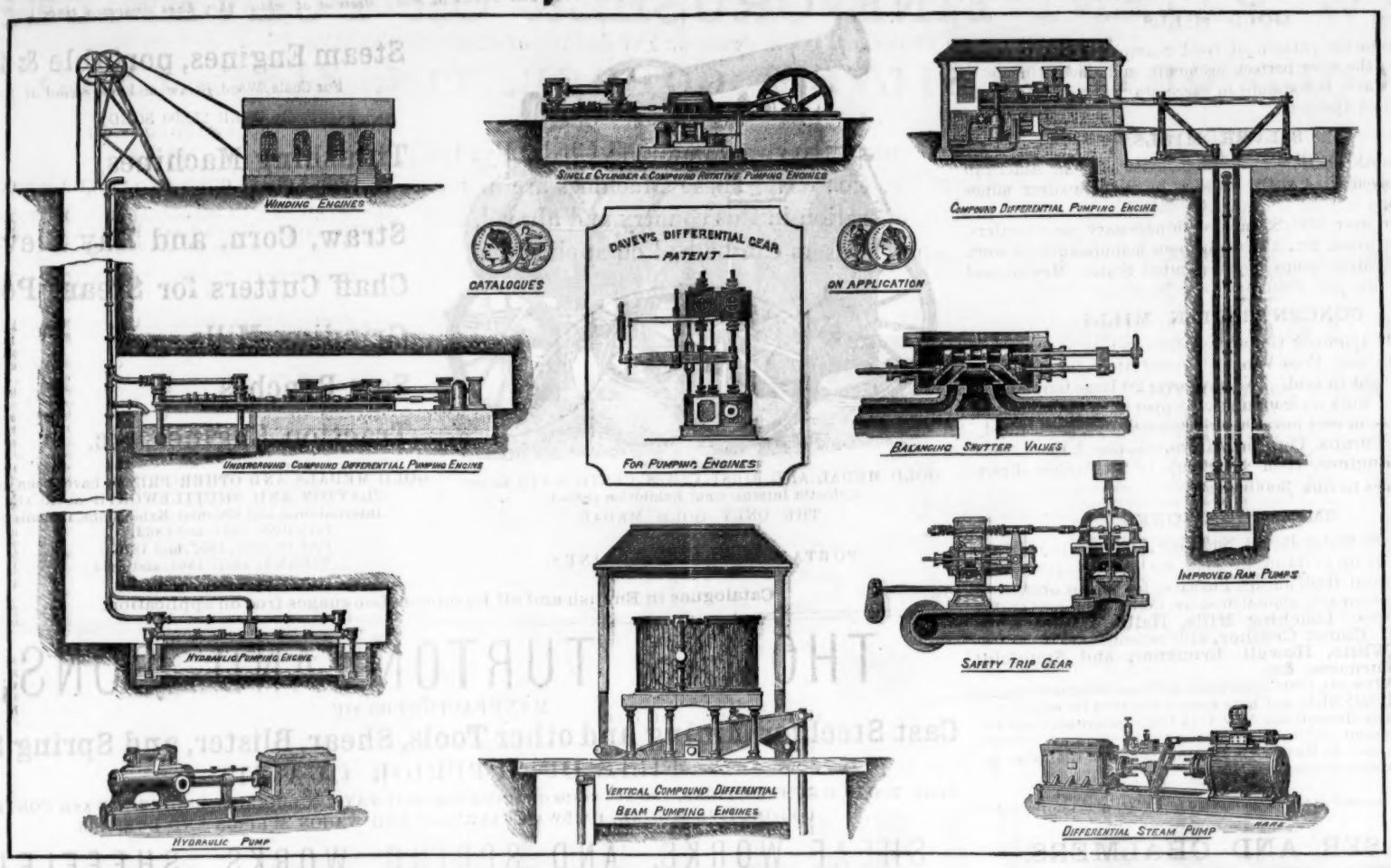
FOR MINING, TUNNELLING, SUBMARINE, AND ALL KINDS OF BLASTING OPERATIONS.

## THE EXPLOSIVES COMPANY (LIMITED)

30 AND 31, ST. SWITHIN'S LANE, LONDON, E.C.

# HATHORN, DAVEY & CO.,

PUMPING MACHINERY. MINING MACHINERY.




# SUN FOUNDRY, LEEDS.

---

ESTABLISHED 1852.

## SYBRY, SEARLS, AND CO.,

MANUFACTURERS OF THE

**CELEBRATED MINING STEEL,** BRANDED SSS

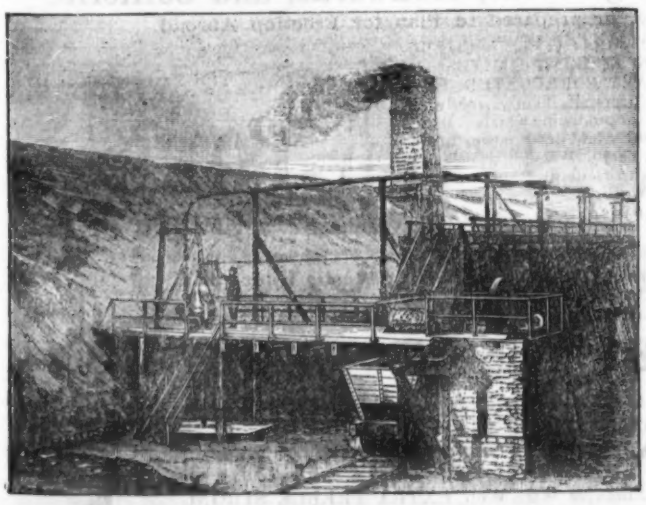
**Cast Steel, Shear, Blister, Spring, Hammer, and Pick Steel.**

## Special Rock Drill Steel.

**Mining Tools, Files, Saws, Hammers, and Picks.**

## CANNON STEEL WORKS, SHEFFIELD.

---



The above Illustration shows a Pulsometer as applied at a Colliery. See following Extract from Testimonial:—

"We have no trouble with the Pump through choking, although during one week we clear about 100 tons of small dust out of ponds for the purpose of settling water. Even with this it still pumps a great quantity of almost slurry coal back to top end of box. I might say it has far exceeded our utmost expectations all the time we have had it applied to coal washing."

## PULSOMETER ENGINEERING COMPANY, Limited,

NINE ELMS IRONWORKS, LONDON, S.W.,

And 61 and 63, QUEEN VICTORIA STREET, E.C.

---

TRADE **The Pulsometer** MARK.

## PATENT STEAM PUMP

Is admirably adapted for all difficult and awkward situations, especially where the Pump has to be suspended on a chain as in sinking operations. The absence of exhaust steam is a great convenience in confined situations. Having no moving parts except the simple and easily replaceable valves it is invaluable for coal washing and ore washing purposes, as it does not cut out with grit and sand as other Pumps do.

SEE CHANGE OF ADVERTISEMENT EVERY FORTNIGHT,
And please mention paper when enquiring.

---

## MINING PUMPS FOR ALL DUTIES.

**Horizontal Plunger Pumps for Gritty Waters and Heavy Pressures.**

**Vertical Plunger Pumps for Sinking Work.**

**Boiler Feeding Pumps.**

---

## ALEX. WILSON & CO.

VAUXHALL IRONWORKS.

LONDON, S.W.,

MANUFACTURERS OF

THE VAUXHALL DONKEY PUMPS.

THE EXCELSIOR DIRECT-ACTING PUMPS.

**Air Compressors.**

**Winding Engines.**

HOISTING MACHINERY.

ILLUSTRATED AND PRICED CATALOGUES ON APPLICATION.

---

MACDERMOTT AND GLOVER'S PATENT

## PERCUSSIVE ROCK PERFORATOR

(IMPROVED)

FOR HAND-LABOUR ONLY,

**IN HARD ROCK.**

FOR MINES, QUARRIES, AND GOVERNMENT CONTRACT WORK.

RATE OF PENETRATION IN GRANITE, 1¼ to 2 inches per minute.

Price £50 complete.

For full particulars, apply to

## GLOVER & HOBSON,

ENGINEERS & MILLWRIGHTS,

ALBERT IRONWORKS, ST. JAMES'S ROAD, OLD KENT ROAD, LONDON, S.E.,

SOLE MANUFACTURERS; OR TO—

**M. MACDERMOTT, 25 and 26, Pudding Lane, London.**

N.B.—A machine can always be seen at work (without notice) at the Albert Ironworks. [ TELEPHONE 4664. ]

---

Now ready, price 25s., post free.

**COMPOUND DIVISION COST SHEET READY RECKONER,**

Designed for effecting in minutes what has hitherto taken hours to accomplish.

For use in making out Cost Sheets of Collieries, Ironstone and other Mines, Iron, Gas, and Water Works, Quarries, and Manufactories generally.

For Accountants, Merchants, Public, and Private Offices.

By WILLIAM WETHERED.

This work is applicable to calculations where any number of articles cost is given sum, and the price of one of such number is required.

The circulation of such a book as this must necessarily be limited. It is doubtful whether it will pay more than the bare cost of publishing, allowing nothing for the enormous amount of labour such a mass of figures has occasioned. The price cannot be named at less than 25s., and it is not too much to say that where it can be applied its cost will be saved in a few weeks. It will be found invaluable to accountants generally.

Copies can now be had, and will be forwarded from the MINING JOURNAL Office on receipt of Post Office Order for the amount.

THE BLAKE-MARSDEN NEW PATENT IMPROVED STONE BREAKERS AND ORE CRUSHERS.

ORIGINAL PATENTEE AND ONLY MAKER.

# H. R. MARSDEN,

ALSO PATENTEE AND ONLY MAKER OF THE

## NEW PATENT FINE CRUSHER OR PULVERIZER,

FOR REDUCING TO AN IMPALPABLE POWDER, OR ANY DEGREE OF FINENESS REQUIRED,

## GOLD QUARTZ, SILVER, COPPER, TIN, ZINC, LEAD

AND ORES OF EVERY DESCRIPTION;

Also Cement, Barytes, Limestone, Chalk, Pyrites, Coprolite, &c., &c. These Machines are in successful operation in this country and abroad, and reference to users can be had on application.

PATENT REVERSIBLE CUBING and CRUSHING JAWS, IN FOUR SECTIONS,

WITH PATENT FACED BACKS, REQUIRING NO WHITE METAL IN FIXING.

CRUCIBLE CAST-STEEL CONNECTING RODS. RENEWABLE TOGGLE CUSHIONS, &c.

OVER **4000** IN USE.

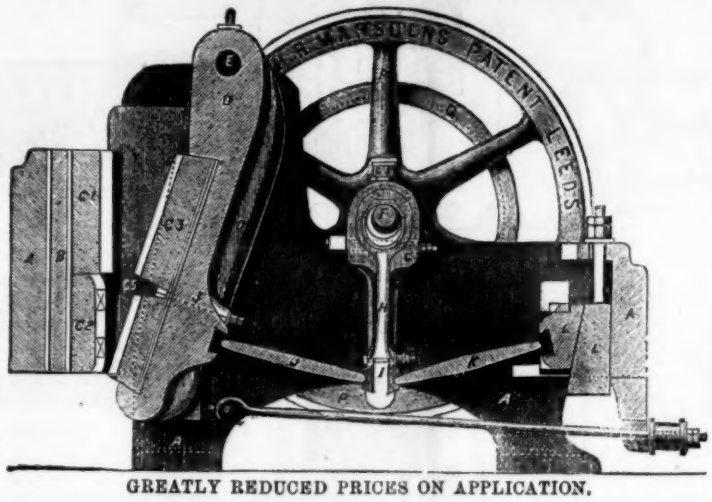
AWARDED OVER

**60**

FIRST-CLASS GOLD AND SILVER MEDALS.

ADOPTED BY THE PRINCIPAL CORPORATIONS, CONTRACTORS, MINING COMPANIES, &c., IN ALL PARTS OF THE WORLD.

ROAD METAL BROKEN EQUAL TO HAND, AT ONE-TENTH THE COST.




GREATLY REDUCED PRICES ON APPLICATION.

EXTRACTS FROM TESTIMONIALS. PULVERIZER.

"I have great pleasure in bearing testimony to the merits and capabilities of your patent combined fine crusher and sieving apparatus. I have tried it on a variety of ores and minerals, and it pulverizes them with equal success. You can put in a small paving stone and bring it out like flour."

"In reply to your favour, I have much pleasure in informing you that the 12×3 Pulverizer we had from you is giving us every satisfaction. The material we are operating on is an exceptionally hard one. I am well satisfied with its working."

"Our experience is that the motion and mechanical arrangements of your machine are the best for pulverizing that we have ever met with."

"The reports from our mines as regards the working of your Fine Crusher (20×5) recently supplied are very favourable, although we cannot quote you exact figures. On being got into position it was tried by hand, with the result that it made short work of the biggest pieces of ore we put into the hopper. You might say how long you would take to deliver another of the same size."

"As I once before stated, your machine is a perfect pulverizer."

"I am sure the machine will be a success, and a great one, and there is any amount of demand for such a machine. We can work it with 20 lbs. of steam, and our engine, which is a 12-h.p., plays with the work, in fact we run the Stonebreaker and the Pulverizer both together with 35 lbs."

EXTRACTS FROM TESTIMONIALS.—STONEBREAKER.

"I now order Three of your Stone Crushers, size 15 × 10, to be of your very best construction, and to include two extra sets of Jaws and Cheeks for each. The last two 24×13 machines you sent me, which are at work in this colony, are doing very well. You will soon find that the railway contractors will adopt your machines in preference to the colonial ones—two of which I have. I know other contractors have had as many as nine of them, which have not given very good satisfaction. Once they know of yours thoroughly, I believe you will do a good trade with the colonies. For reference of the high character of your constructions you can refer to me as having used them with the very best results, both in New Zealand and this colony, and much prefer them to the colonial article, both in point of construction and less liability to go out of order. The material we are crushing is very hard blue stone, for railway ballast purposes. Push on with the order as quickly as possible; I do not think it necessary to have any engineering inspection. I have brought your machines prominently under the notice of all large contractors in this colony, likewise the Government. Many of the contractors have spoken to me in reference to their capabilities, and I could only tell them that they are by far and away the best and most economical I ever used. The very fact of me having purchased now Eleven from you at various intervals and various sizes, and two above 12 years ago, and having tried all the other makers, is sufficient guarantee of the capabilities and the working of your machines. Yours in every way surpass all others."

"Some of your testimonials do not give your machines half their due. I have seen men hammering away on a big rock for a quarter of a day which your machine would reduce to the required size in a quarter of a minute. I would guarantee that your largest size machine would reduce more of the Cornish tin capels (which is the hardest rock of England) in a day than 200 men, and at 1-25th the cost."

FOR CATALOGUES, TESTIMONIALS, &c., APPLY TO THE SOLE MAKER,

H. R. MARSDEN, SOHO FOUNDRY, LEEDS.

# JOHN CAMERON'S

SPECIALITIES ARE HIS

## STEAM PUMPS

FOR

## COLLIERY PURPOSES.

Specially adapted for forcing Water any height

ALSO, FOR

## SINKING, FEEDING BOILERS AND STEAM FIRE ENGINES,

Of which he has made over 9000.

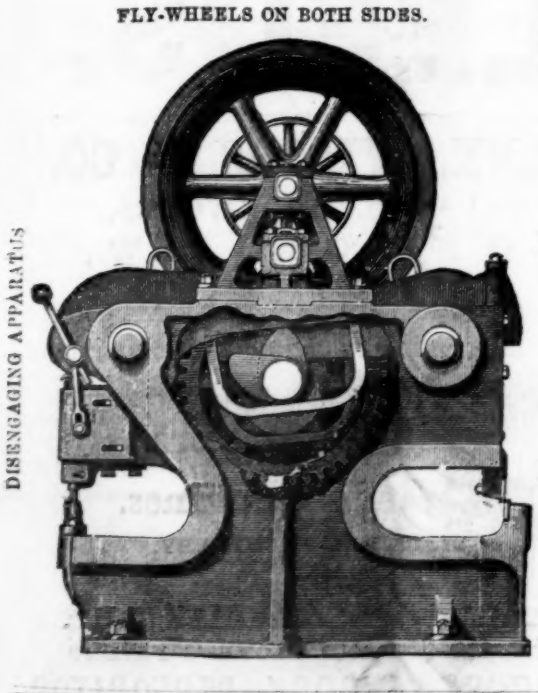
ALSO, HIS

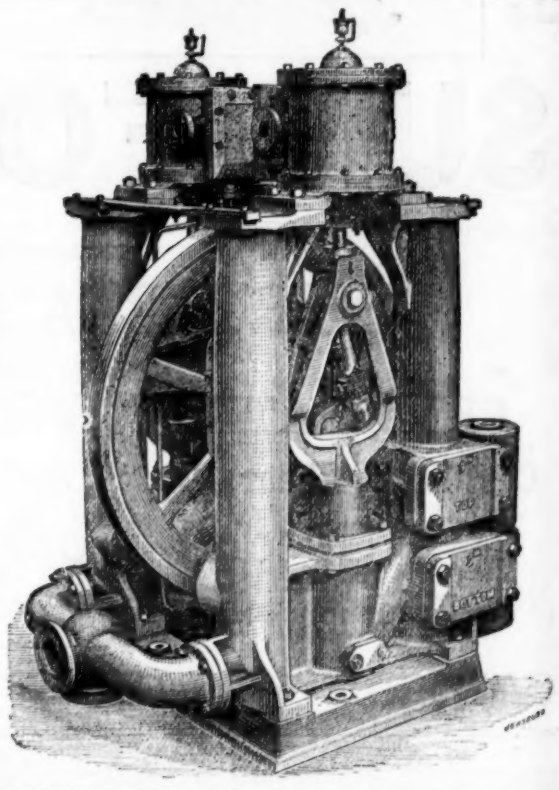
PATENT CAM AND LEVER PUNCHING AND SHEARING MACHINES.

**Works: Oldfield Road, Salford, Manchester.**

AGENTS { For LONDON and DISTRICT—PRICE and BELSHAM, 52, QUEEN VICTORIA STREET, E.C.
For NEWCASTLE and EAST COAST—E. BECKWITH AND CO., BONNERSFIELD, SUNDERLAND.

FLY-WHEELS ON BOTH SIDES.



HEPBURNS' PUMP LEATHER WATERPROOF

By a special method of preparation this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

HEPBURN AND GALE, LIMITED,
TANNERS AND CURRIERS,
LEATHER MILL BAND AND HOSE PIPE MANUFACTURERS,
LONG LANE, SOUTHWARK, LONDON.
Prize Medals, 1851, 1855, 1878, for
MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

SPECIAL.

## PULLEY BLOCKS

AND

## BRASS FERRULES

ALL KINDS.

HOME AND EXPORT. CHEAPEST AND WARRANTED.

SEND FOR PRICES.

**GRIMSHAW & CO.**

Mechanical Engineers, Brass Ferrule Makers, &c.,

ACCRINGTON, LANCASHIRE.

ESTABLISHED 1825.

# EDWIN LEWIS AND SONS,

Patent Tube Works, MONMORE GREEN and Britannia Boiler Tube Works, ETTINGSHALL,

## WOLVERHAMPTON.

MANUFACTURERS OF

**Lapwelded & Buttwelded Wrought-iron, Steel, or Homogeneous Tubes**

FOR EVERY

## COLLIERY OR MINING PURPOSE.

## J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),

Manufacturers of

## CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS, RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions

**WELDED STEEL CHAINS** { FOR CRANES, INCLINES, MINES, &c., MADE ALL SIZES.


Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors) at their offices, 26, FLEET STREET, where all communications are requested to be addressed.—*May* 31, 1884.